AN INTERACTIVE COMPUTER MODEL TO ASSIST MARINE CORPS ENLISTED PERSONNEL ASSIGNMENTS

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THESIS

An Interactive Computer Model
To Assist Marine Corps
Enlisted Personnel Assignments

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and the marine's eligibility for deployment with a given unit based on obligated service. The model is implemented using an APL interactive language for terminal use by the Personnel Classification and Assignment Officer at the 2nd Marine Division.

An Interactive Computer Model
to
Assist Marine Corps Enlisted Personnel Assignments

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ABSTRACT

An interactive computer model is formulated and analyzed which is designed to assist in enlisted personnel assignments within the 2nd Marine Division. The model uses data which currently exists within the Manpower Management Information System, and bases its assignment recommendations on a number of factors. These include current unit strengths, distribution of racial minorities, distribution of lower mental groups, and the marine's eligibility for deployment with a given unit based on obligated service. The model is implemented using an APL interactive language for terminal use by the Personnel Classification and Assignment Officer at the 2nd Marine Division.

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I. PROBLEM DESCRIPTION

A. BACKGROUND

In early 1973, the 2nd Marine Division at Camp LeJeune, North Carolina assigned a team of two operation analysts to investigate the causes and possible solutions to personnel turbulence within the Division resulting from a long standing commitment of manning deployments to the Mediterranean, Carribean and Guantanimo Bay, Cuba (See reference 7).

In essence, the problem at that time was that just prior to a unit's deployment a great number of inter-unit transfers were required as some of those Marines scheduled to deploy were in fact ineligible as determined by a variety of reasons. As it is imperative that a deploying unit be manned at full strength there resulted many last minute substitutions. These last minute transfers created a number of serious problems among which poor unit integrity and lack of morale were most prevalent.

This study group set forth two major recommendations of interest. First, it suggested that the deployment schedule be rotated from regiment to regiment in an effort to settle some of the turbulence at the regimental level thus creating at that point some unit integrity and pride. Secondly, and of primary interest here, was that it proposed an interactive computer system to assist in personnel assignment be implemented to attempt to minimize the inter-unit transfers just prior to deployment.

B. CURRENT METHODS AND PROBLEMS

At the present time, when a marine reports aboard the 2nd Marine Division he reports to the Personnel

Classification and Assignment Officer (PC&AO) for assignment to a unit within the division. This process is done manually with the assistance of personnel reports from 2nd Marine Amphibious Force Automated Services Center (II MAF ASC). Typically the information contained in these reports is up to 3 weeks old. The PC&AO then pages through these reports searching for that battalion which in his opinion has the most critical need for this particular Marine's MOS (military occupational specialty) and rank. An attempt is then made to verify that any one battalion contains no more than 50% of any minority group. Finally, a rough check is made to determine that the marine's expiration of active service (EAS) date does not coincide with that battalion's scheduled deployment date.

Once these checks are made the PC&AO may assign the marine to any of 20 battalions or any of 4 regimental headquarters companies. A decision is made and the marine is assigned to one of the above 24 units. Once one of these assignments is made, the PC&AO leaves the picture entirely and he receives no further feedback concerning this marine's assignment within the division until the man is joined to a unit and Manpower Management System records are updated to reflect this fact. At this point, a marine may take either of two paths depending on the assignment.

1. If the marine is to be assigned within one of the four regiments, he is directed to report to the regimental adjutant. The adjutant processes the marine administratively and then directs him to the proper battalion.

2. If the marine is to be assigned to a separate support battalion he is directed to report directly to that battalion adjutant.

In either case the marine is passed down the chain of command until he reaches the battalion adjutant who must further assign the marine to a lower echelon. The battalion adjutant has a narrower choice of assignment since he typically has 5 or fewer Reporting Unit Codes (RUC's) subordinate to him. It is at this level that the assignment is totally manual and subject to non-optimal assignments. It is difficult to enforce high level management policies at this level.

As can be easily seen, an individual marine can often be sidetracked for a variety of reasons from a unit with the most crucial need. In essence, there are two different assignment processes going on at two different levels of abstraction. The division PC&AO is farthest from the individual billet assignment and it should be noted that his information is in fact the most out of date. Secondly at the heart of the assignment is the battalion adjutant. Here there exists a great deal of communication between the battalion staff and the company commanders so that of the two, the battalion adjutant probably has the most important assignment.

Currently there exist the following three problems:

1. Non-deployables are often assigned to a deploying unit.
2. Assignments are made based upon old information.
3. High level management policies are difficult to enforce.

The solution is to somehow come up with a method of personnel assignment which results in very few transfers when a battalion deploys, and at the same time bases assignments on more current information while enforcing high level management policies.

C. PROBLEMS OF USING COMPUTER DATA BASES AT THE MCC LEVEL

Currently, the Marine Corps maintains and utilizes a personnel data base called the Manpower Management System (MMS). The system itself is quite extensive, and the only method available to personnel managers for accessing the information is through batch processing using either COBOL or Mark IV information retrieval. As of this time there exists no on-line method of data retrieval and since most assignment information is needed on an immediate basis a time sharing system would be useful, however little if any effort has ever been put forth in this area. In this thesis an interactive computer model to assist in personnel assignment is proposed as a feasible solution.

D. OUTLINE OF REMAINING THESIS

A general model description is set forth in section II covering such areas as model goals, available sources of data and the system design. In section III more detailed model intricacies are described discussing the actual construction and implementation. Finally in section IV conclusions and future lines of development are set forth.

II. GENERAL MODEL DESCRIPTION

A. GOAL OF THE MODEL

There are four basic criteria that need to be met to satisfy the goal of optimal assignment. These are (1) to reduce inter-unit turbulence, (2) to assign a marine to a billet based on overages and shortages at the RUC level, (3) to implement management policies regarding equitable racial distributions, and (4) to implement management assignment policies regarding an equitable distribution of mental groups IV and V. These goals are treated separately below.

1. Reduction of Inter-unit Turbulence

No battalion can deploy without being at full strength. Typically many of the personnel in a battalion at deployment date cannot be deployed, for various reasons. The most important reason is that their EAS date falls during the deployed period, and typically there are 700 to 800 non-deployables in that battalion prior to departure. These marines must all be transferred to other units or the sub-unit. The model does not recommend assignment of a marine to any unit which will be deployed during his EAS. Although currently the model does not consider other non-deployability restrictions such as those concerning seventeen year old marines, sole surviving sons, and previous deployments, these could easily be added at a later date if deemed important.

2. RUC Level Shortages and Overages

Presently the PC&AO has the choice of assigning a marine to any one of 20 different battalions or 4 regimental headquarters companies. The only prerequisite is that the

unit has a billet with characteristics closely matching those of the marine. For example there are billets for MOS 0121 (Personnel Clerk) in each of the above 24 units. However, there are billets for MOS 5508 (Bandsman, Bassoon) in only one of the above units, in particular the Headquarters Battalion. To assist in assigning a marine, the PC&AO has available a computer listing which tells him which units rate a marine of this MOS. From current strengths he decides which one of the 24 units is in most need of the marine, and then assigns him to that battalion / regimental headquarters "most in need". Once the marine reaches the battalion level he is then assigned to a company / RUC. Consider the following simple example:

Suppose a marine reports to the 2nd Marine Division with a primary MOS of 0311 (rifleman). The PC&AO looks through his computer listing and determines that one particular battalion has a shortage in this MOS, say 1st Battalion, 2nd Marines. He then sends the marine to the 2nd Marine Regiment who in turn sends the marine to their 1st Battalion. It is here that the battalion adjutant must make the decision as to which of his 5 companies to send the marine. Through a totally manual process the 1st Battalion adjutant assigns the marine to one of the five subordinate companies, say Company B. The marine is then sent to Company B of the 1st Battalion of the 2nd Marine Regiment where he reports to the company First Sergeant. It is Company B which is the Reporting Unit for this marine until he is transferred.

The computer model proposed in this thesis looks at overages and shortages at the RUC level, and determines the net requirements by MOS and pay grade. The model takes into consideration those marines that are expected to leave under orders, those that are expected to leave due to EAS, those that are remaining in a unit due to administrative

detainment and those remaining for convenience of the government. Basically, the model then uses a utility function described below in section III B to rank the possible assignments among 95 companies / RUCs. This contrasts with the present method of determining the optimal assignment among only 24 battions / regimental headquarters, without the aid of a precise quantitative function. The function which is used in this model is described in detail in section III B.

3. Equitable Racial Distribution

Over the past few years the military in general has experienced increases in the number of minorities. these increases have affected the 2nd Marine Division and racial problems are of major concern. The model calculates the effects of the implementation of various management policies regarding an equitable distribution of racial mixture. Methodological details are described in section III B.

4. Equitable Distribution of Mental Groups IV and V

With the volunteer military has come a marked change in the average mental capabilities of new recruits. At present there is no enforced policy on the distribution of lower Mental Group marines. The model calculates the effects of the implementation of various management policies regarding an equitable distribution of lower mental groups. Methodological details are described in section III B.

B. AVAILABLE DATA SOURCES

The model requires inputs from two sources, both of which are standard and readily available from the current Marine Corps Manpower Management Information System. These sources are the Table of Manpower Requirements (TMR), which

contains every billet for every company / RUC in the entire Marine Corps, and the Manpower Management System (MMS) which contains pertinent information about each marine in the entire Marine Corps.

The model uses the TMR file and the MMS file to extract the necessary information to make assignments. There are three files created using the MMS and the TMR files as are discussed in the next section.

C. MODEL DESCRIPTION AND FLOWCHART

The model can basically be broken down into two segments, File Creation and Interactive Assignment.

1. File Creation

File Creation is accomplished by processing the TMR and MMS files in such a manner as to construct the following three files.

a. MANLEV is a matrix containing the overages and shortages for each type of billet in every RUC. It is created by processing the TMR file to find the number of billet types in a RUC and by processing the MMS file to determine how many marines are currently filling each type of billet. The exact file format is given in Appendix D. Each row of MANLEV corresponds to a different MOS and RUC combination.

b. DUEIN is a matrix in which each row is a literal vector which contains information pertinent to a particular marine's assignment. It is created by searching the MMS file for records of those marines who are expected to report to the 2nd Marine Division in the future. Once these records are found, the appropriate information is extracted

and stored in DUEIN. The exact format is shown in Appendix D.

c. MINOR is a matrix containing for every RUC an encoded value indicating the number of marines who are members of a minority group and the number who are of mental group IV or V. It is created by processing the MMS file and its exact format is shown in Appendix D. Each row of MINOR corresponds to a RUC.

Programming for this segment was done in a batch mode using Standard COBOL and FORTRAN IV. Source listings for these utility programs are shown in Appendix B.

2. Interactive Assignment

Once the above three files have been created the model changes to an interactive mode for the actual assignment process. Basically this segment, when cued by a social security number, processes the two files, MANLEV and MINOR. Through the use of a utility function a relative set of weights are generated for each man/billet combination based upon the incoming marine's primary, secondary and tertiary MOS's. Similiarly for each of these man/billet combinations, another utility function is used to generate a relative goodness of fit for that marine to the individual unit (RUC) based on race and mental group. Finally, a check is made to determine whether or not the marine will be deployable with the assigned unit based upon EAS considerations.

Appendix C contains source listings of these assignment functions.

A basic system flowchart is shown in Figure (1) below.

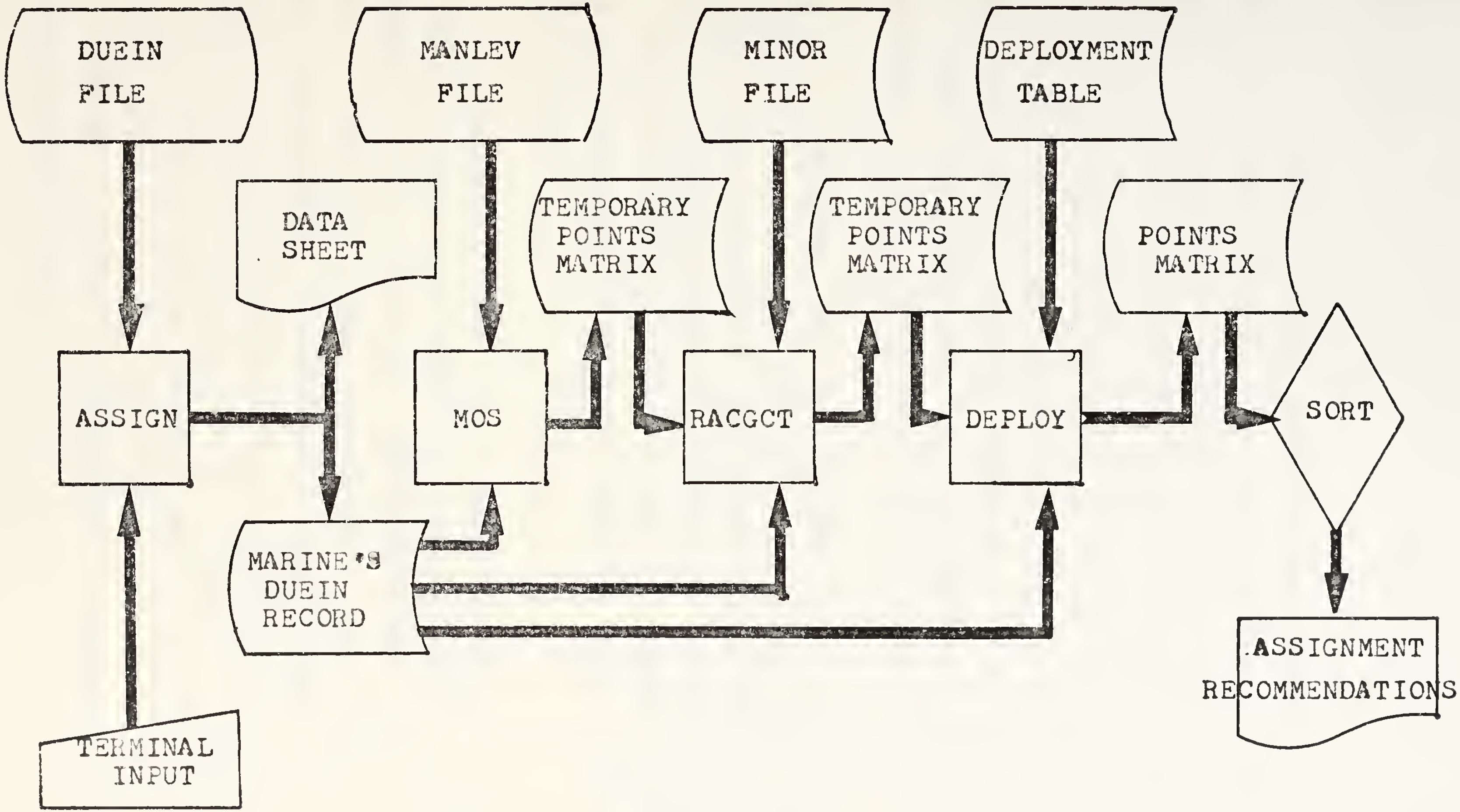


FIGURE 1
BASIC SYSTEM FLOWCHART

APL was chosen as the source language for the interactive assignment segment based on the following considerations.

a. Ease of manipulating files stored as arrays or vectors. APL is one of the most simple, concise and powerful programming languages ever devised. Scalar operations extend in a natural manner to vectors and arrays of any size or shape. For example multiplication of two compatible matrices A and B that in other languages would require at least two loops and a dozen or more statements becomes simply A+.xB in APL. Facilities are also present which allow the addition of a dimension to any array (lamination) as well as the addition of length (catenation).

b. Designed for interactive mode and information retrieval. Since so many computer operations are described by single APL operators and data declarations are seldom required, APL lends itself quite well to on-line interactive use. Thus with little effort a user can query a particular file for information as well as updating other segments of the same file.

c. Ease of use and understanding. The APL programmer needs to know extremely little about data representation or internal operations of the digital computer. Thus he can concentrate his efforts on the precise manipulation of the data. For the most part he is freed from the task of indexing or looping which seems to be prerequisite for other high level languages currently in use. In addition, there exists no need to master the entire language before using it. The programmer can start using the language almost immediately without any prior programming experience.

d. APL is currently in use by Headquarters Marine Corps. Although originally written as a scientific language APL now finds widespread use in data manipulation and Management Information Systems. As MMS is a primary source of information for manpower managers within Headquarters Marine Corps, two specific actions have been taken to improve data availability. These are the construction of a subset of MMS containing high use data items and the implementation of the Remote Entry Data Display Pilot Test (REDDPT). One of the major software routines of the REDDPT's implementation was the APL-PLUS Time Sharing System. The APL-PLUS Time Sharing System is a general purpose time sharing system well suited for any application normally considered amenable to a time sharing environment.

III. DETAILED MODEL DESCRIPTION

A. FILE CREATION AND STRUCTURE

This section contains the details of file creation and building the structure needed for the interactive assignment program which is described in III B. There are five programs necessary to create the three files MANLEV, DUEIN, and MINOR which are required by the interactive assignment program. The five programs, called STEP 1 through STEP 5, are described as follows:

STEP 1.

This program takes the TMR master file as input and selects those TMR's related to the 2nd Marine Division. Associated with each RUC is a TMR number. Using the TMR numbers for each RUC in the 2nd Marine Division to process the master TMR file yeilds a smaller file of about 1700 types of billets in the 2nd Division for about 16,000 enlisted marines. This process resulted in one minor discrepancy which made STEP 2 and STEP 3 necessary. Headquarters Company of Headquarters Battalion as it currently exists is a collection of two TMR's and hence these two TMR's had to be combined.

STEP 2.

This program takes the TMR's which are output from STEP 1 and uses a simple utility sort to sort the TMR's into MOS major sequence, with RUC a minor sequence. These TMR's are then output in the new order.

STEP 3.

This program takes the results of STEP 2 and combines the two TMR's for Headquarters Company of Headquarters Battalion.

STEP 4.

This program processes the MMS master file and selects the records for only those marines that are presently in the 2nd Marine Division or are soon to be

transferred there. These records are then ouput for further processing by STEP 5. Due to regulations regarding confidentially of information within MMS, it was not feasible to have name or service number for purposes of developing and testing the model. STEP 4 also creates pseudo service numbers and pseudo names which are required by the assignment program. In an operational situation service numbers and names would be available and used.

STEP 5.

This program is quite complex and relies on the output from the previous four steps. STEP 5 is the only program which processes both the TMR file and the MMS file and it is in STEP 5 that MANLEV, DUEIN, and MINOR are created (See Appendices B and D).

Each of the TMR records which are output from STEP 3 contains MOS, RUC and number of marines required of each rank. As these TMR records are read in, they are checked to see if that particular RUC is cadred (maintained at strength zero). If it is a cadred unit then TMR's for that unit are not considered. After the TMR's have been read in, the number of marines in each rank is encoded to conserve space by multiplying each value by 200 and then placed in MANLEV. See Appendices B and D for details of encoding.

STEP 5 then processes the MMS records which are output from STEP 4, one record at a time. Three processes are applied to each record before the next record is read. These are:

1. Determine which billet each marine is presently filling and reflect this by adding one to the on-hand (OH) for that billet in MANLEV.

2. If the marine is filling a billet then his race and mental group are used to create MINOR (See Appendices B and D). If the marine is of a minority racial group then MINOR is modified to reflect this fact. Determining the marine's mental group is based solely on the General Classification Test (GCT) which is essentially a very comprehensive intelligence test. Mental group categories are:

I	130 - above
II	110 - 129
III	90 - 109
IV	65 - 89
V	0 - 64

MINOR also has encoded values to conserve space. See appendices B and D for details of encoding.

3. If the marine is expected to report to the 2nd Division, then his record is placed in a third file called DUEIN.

It should be pointed out that there are a number of management policies involved in the decision as to which billet a marine is presently filling in a RUC. STEP 5 presently looks at a marine's three MOS's and if his billet MOS matches any one of the three, it is assumed that this is the billet that he presently fills. If a billet is not yet determined for the marine then the primary MOS is checked for a basic MOS (XX00). If the marine has a basic MOS it is assumed that he is filling the billet designated by his billet MOS. If a billet is still not determined yet, it is assumed that the marine is filling a billet in his primary MOS.

There are also a number of factors involved in deciding whether or not a marine should be eligible for replacement. The model assumes that if a marine has 30 or less days until

EAS that he should be eligible for replacement now if possible. Those marines that have less than 30 days until departure on orders are considered replaceable as are marines that remain in a unit for convenience of the government, and those marines that are remaining under administrative detainment.

STEP 5 has three outputs which are necessary for the interactive program to function. These outputs are MANLEV, MINOR, and DUEIN (See Appendices B and D).

B. ASSIGNMENT PROCESS

1. Assignment Functions and Point Generation

The assignment section consists of eight APL functions. Of these eight, five are used to generate the actual assignment recommendations while the other three relate to input / output operations.

The function ASSIGN is used as the driver for the entire process. After initiation the user is queried for the incoming marine's social security number. The SSN is then used to key the file DUEIN. If the man's record is found, it is read into the active workspace. If not, the program asks for input at the terminal.

Once the incoming marine's record has been entered either by remote entry or through the use of the DUEIN file the dyadic function MOS processes the overages and shortages (O/S) for each unit which rates this particular marine's primary MOS. To accomplish this, a search is made of the MANLEV file for all units which according to Table of Organization (T/O) would rate this marine. The result of this search is a vector MOSV which contains the row indicies of MANLEV for each unit so described. The current manning

levels are then decoded by rank within each unit. At this point a weighting function is used to assign points to each unit based on their overages and shortages (O/S).

Consider some fixed RUC. O/S points for this RUC are computed as follows. Let $P_i(x_i,y_i)$ equal the number of points assigned to this unit when it has a requirement of size x_i in grade i according to the T/O, and currently has y_i people of grade i assigned to it.

Then

$$P_i(x_i,y_i) = (x_i-y_i)C^{x^i+y^i}$$

where C is a constant.

This function was devised based on the following two considerations.

a. The desired function is symmetric about the line x=y with P(x,x) = 0. Thus the function penalizes assignments to a unit manned at greater than 100% in the same manner in which it rewards assignments to a unit manned at less than 100%.

b. Slightly higher assignment points should be given to the larger unit when two units have the same relative percentage of surplus or shortage. In this manner a unit which rates one marine and is manned at zero strength would not have as critical a shortage as the unit which rates two marines and is manned at zero strength. Thus if m is the maximum desired strength over all ranks and RUCs, then

$$P_i(m,0) > P_i(1,0).$$

According to the weighting equation given above

$$mC^m > C$$

which after some algebraic manipulation reduces to

$$C > (1/m)^{(1/m-1)}.$$

Currently m has a maximum of 131 for the 2nd Marine Division, therefore

$$C > .9632.$$

To demonstrate how insensitive the constant C is to changes in m three other values have been calculated and are as shown below.

m	minimum C
101	.9549
151	.9671
201	.9738

It is also worth while to note that C must be strictly less than 1 since otherwise the function would grow exponentially in an uncontrolled manner. C has thereby been narrowed down to the region (.9632, 1.00), given m = 131. The midpoint of this interval (.9816), was chosen for use in this model as it produced a quite reasonable set of points as are demonstrated below in Table 1.

T/O STRENGTH

ON HAND STRENGTH

	1	2	3	4	5	10	20	30	50
1	0.0	0.95	1.86	2.73	3.58	7.34	12.86	16.31	19.00
2	-0.95	0.0	0.91	1.79	2.63	6.40	11.96	15.45	18.27
3	-1.86	-0.91	0.0	0.88	1.72	5.50	11.09	14.63	17.56
4	-2.73	-1.79	-0.88	0.0	0.85	4.63	10.25	13.83	16.87
5	-3.58	-2.63	-1.72	-0.85	0.0	3.78	9.43	13.05	16.20
10	-7.34	-6.40	-5.50	-4.63	-3.78	0.0	5.73	9.52	13.13
20	-12.86	-11.96	-11.09	-10.25	-9.43	-5.73	0.0	3.95	8.18
30	-16.31	-15.45	-14.63	-13.83	-13.05	-9.52	-3.95	0.0	4.53
50	-19.00	-18.27	-17.56	-16.87	-16.20	-13.13	-8.18	-4.53	0.0

TABLE 1.

The reader should note however, that for a fixed value y_i the function $P_i(x_i, y_i)$ approaches zero as x_i approaches infinity. Users should therefore be cautioned that the utility function as currently written will only produce reasonable results when the slope is positive (i.e. when the differential $(x_i - y_i)$ is less than $-1/\log_e C$).

Points are thus calculated indicating how well the marine fits to each rank (E-1 through E-9) for units rating his MOS. This is done since it is not always desirable or feasible to assign an individual marine to a billet commensurable with his rank. Sometimes it is necessary to assign an E-3 to an E-4 or even an E-5 billet. In this regard a set of weights called ASSIGNWT was devised. ASSIGNWT is a matrix of weight values w_{ik}. The row elements can be interpreted as fractions indicating how often a marine of rank i should be assigned to a given billet requiring rank k based on rank structure. Consider for example, row 4 of ASSIGNWT which corresponds to an E-4. Its elements are as shown below.

E-1	E-2	E-3	E-4	E-5	E-6	E-7	E-8	E-9
.00	.00	.05	.60	.20	.10	.05	.00	.00

If the incoming marine is an E-4 this row says that 60% of the time he should be assigned to a billet designated for an E-4. 20% of the time he should be assigned to an E-5's billet and so on.

By applying these weights and summing over the ranks (E-1 through E-9) a unit's total O/S weight is generated. For a marine with rank i, this total weight is given by

$$P_{O/S}(x,y) = \sum_{k=1}^{9} w_{ik} \, P_i(x_k, y_k)$$

where

$$x = (x_1, x_2, \ldots, x_9)$$

$$y = (y_1, y_2, \ldots, y_9).$$

It should be noted at this point that the actual T/O considers the ranks E-1 and E-2 as equivalent ranks for manning purposes. Thus instead of supplying a breakdown of the requirements for both E-2's and E-1's it simply supplies an aggregate total for the two ranks (E-2/E-1). The model implementation therefore, differs slightly from the above description in that it operates over the ranks E-1/E-2 through E-9 vice E-1 through E-9.

The second and third sets of points generated pertain to how well the individual marine fits into each unit based on his race and mental group. Two functions are used to generate these two sets of points, called Q and R respectively.

As previously mentioned MINOR contains for each RUC, the number of marines who are members of a minority racial group and also the number of Category IV's and V's. Section III A described how the file MINOR was created and its form is shown in Appendix D.

The first step in point generation is to determine what percentage or fraction of the total division population is a member of a minority group and also what fraction is of mental group IV or V. Let these division level fractions be denoted by m and g respectively. At the same time, for each

unit j in the division, a number m_j must be determined which indicates what portion of unit j's total population which are members of a minority group. Similiarly g_j is determined as the fraction of unit j who are Category IV's or V's. In this manner it is possible to tell at a quick glance whether or not any unit has an inequitable distribution based on the division population.

Two weighting functions are then used to generate a set of points for each reporting unit, which indicate how well an incoming marine will fit into that unit given his race and mental group.

Points are calculated for each unit based on the following equations

Let $Q_j(m,m_j,i)$ be the points generated by assigning an incoming marine with race type i to RUC j when RUC j has a fraction of minorities equal to m_j, and the division has a fraction m. Then

$$Q_j(m,m_j,i) = (-1)^i((1-m_j/m)ALPHA)^3,$$

where

$i = 0$ if a member of a minority group,
$i = 1$ if caucasian,
ALPHA = constant.

Let $R_j(g,g_j,i)$ be the points generated by assigning an incoming marine of mental type i to RUC j when RUC j has a fraction of mental type i equal to g_j, and the division has a fraction equal to g. Then

$$R_j(g,g_j,i) = (-1)^i((1-g_j/g)\,\mathrm{ALPHA})^3,$$

where

$i = 0$ if Mental Group IV or V,
$i = 1$ if Mental Group I, II or III,
ALPHA = constant.

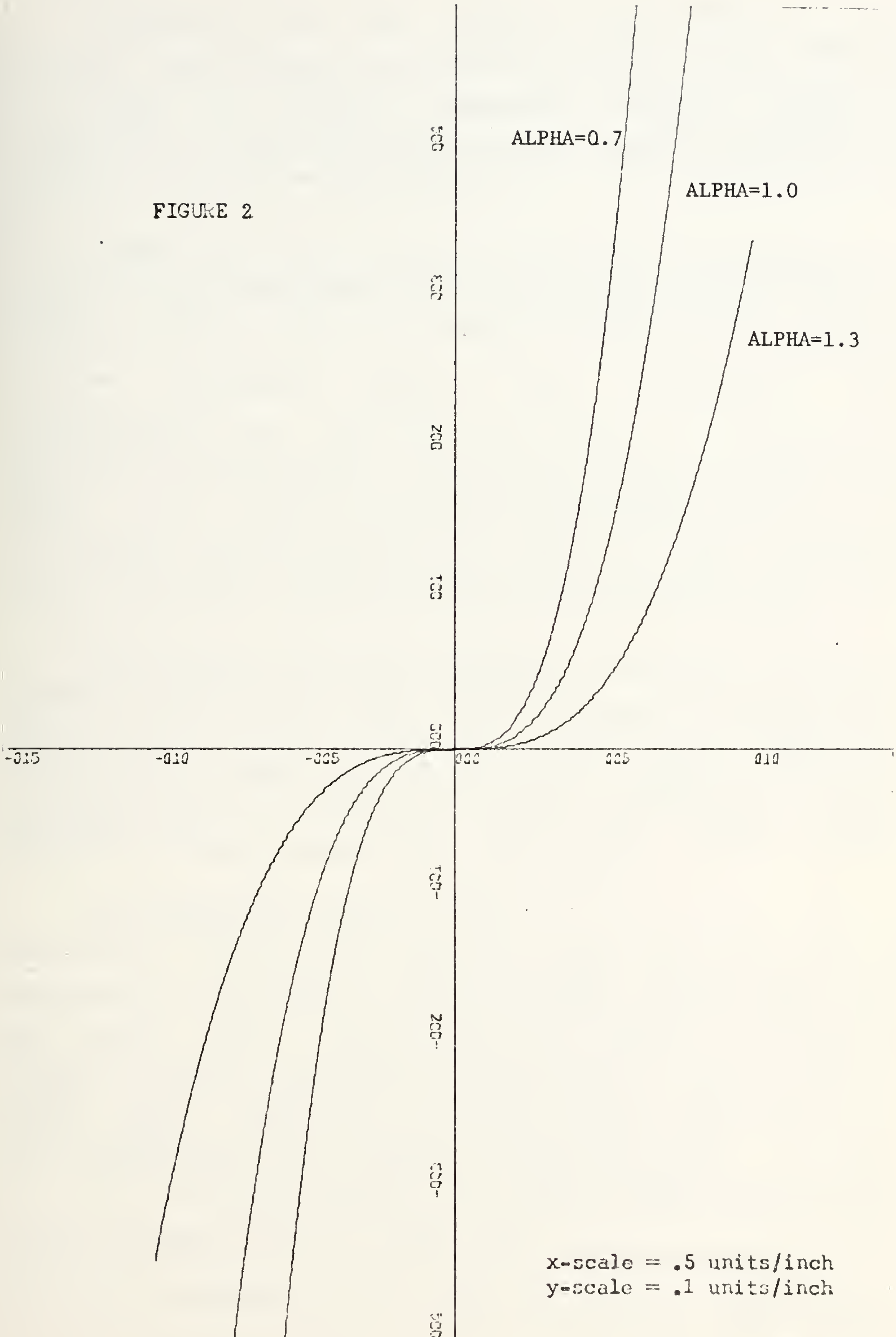
These functions were chosen primarily for the following two reasons.

a. The desired function should measure the relative difference between m_j and m, and g_j and g, for all RUCs j.

b. When $i = 0$ the desired function should award significantly more points to those units with large positive differentials and in the same manner penalize those units with large negative differentials. The opposite must be true when $i = 1$.

The variable ALPHA is included in these functions to enable management to flatten out the curve as is illustrated in Figure 2. This figure shows a graph of these functions for three different values of ALPHA.

FIGURE 2


ALPHA=0.7
ALPHA=1.0
ALPHA=1.3
x-scale = .5 units/inch
y-scale = .1 units/inch

Currently, both the minority group points and the mental group points are calculated based on the same value of ALPHA. If however, management somehow deemed it desirable to use different values, a simple change could be made to the code to facilitate it.

These two functions (Q & R) have been implemented in a slightly different manner than is described above. Since m and m_j and g and g_j are fixed as long as the data base remains unchanged, points have essentially been precalculated for each RUC j and stored in the file MINOR. This is done by assuming the incoming marine's "type" i is equal to 0. Then during the actual assignment, if it is determined that the marine is of "type" 1, the appropriate sign corrections are made to this precalculated value.

Two programs are used to generate the racial and mental group points. The first is run as part of an initiation routine and it is here that the actual point generation takes place. Each time the data base is updated, a new set of points must be calculated. The other routine simply performs a table lookup at execution time.

The points are thus generated for each unit and as previously mentioned are stored in MINOR. During the actual assignment, the marine's record is checked for both his race and mental group. If the marine is a member of a minority group the points as previously described are appended to a points matrix indicating how well he fits into that unit. Mental group points are handled in the same manner. It may be seen in the definitions of Q_j and R_j above, that if the incoming marine is not a member of a minority group, or if he is not a Category IV or V, then the race and mental group

points are negative when $m_j > m$, and $g_j > g$ respectively.

The points matrix now contains three different measures of how well the marine fits into a given unit namely, overage and shortage points, race points and mental group points.

There is one other factor which must be dealt with at this time and it relates to the personnel turbulance problem discussed in Section I A.

Turbulance as earlier discussed, is brought on primarily by assigning a man to a unit which will be deployed during his EAS. The obvious solution to this would be to simply compare the marine's EAS date with the current deployment schedule thus determining a deployability status for each unit under consideration. The function DPLOY accomplishes this task in exactly that manner. As was mentioned earlier other deployability restrictions such as age (17 year-olds), sole surviving sons, and previous deployments could be checked in the same manner thus determining the overall deployability status by a simple intersection.

2. Normalizing Factors (Weights)

The assignment process combines overage / shortage points, race points and mental group points to form an aggregate total which is the basis for recommended assignments. Combining these points in a straight forward manner is like combining "apples and oranges". To solve this problem it is necessary to reduce all point types to dimensionless numbers which are compatible. A random sample of 2000 points for each of the three types of points was generated. These points were then processed using a

standard histogram subroutine package. Results of overage / shortage points are shown below in figure 3, race points are shown in figure 4, and mental group points are shown in figure 5. It can easily be seen from these three histograms that each of these three types of points are reasonably close to a normal distribution. This leads in a natural way to normalizing each of the three types to a mean of 0 and a standard deviation of 1, by subtracting the mean and dividing by the standard deviation for each type.

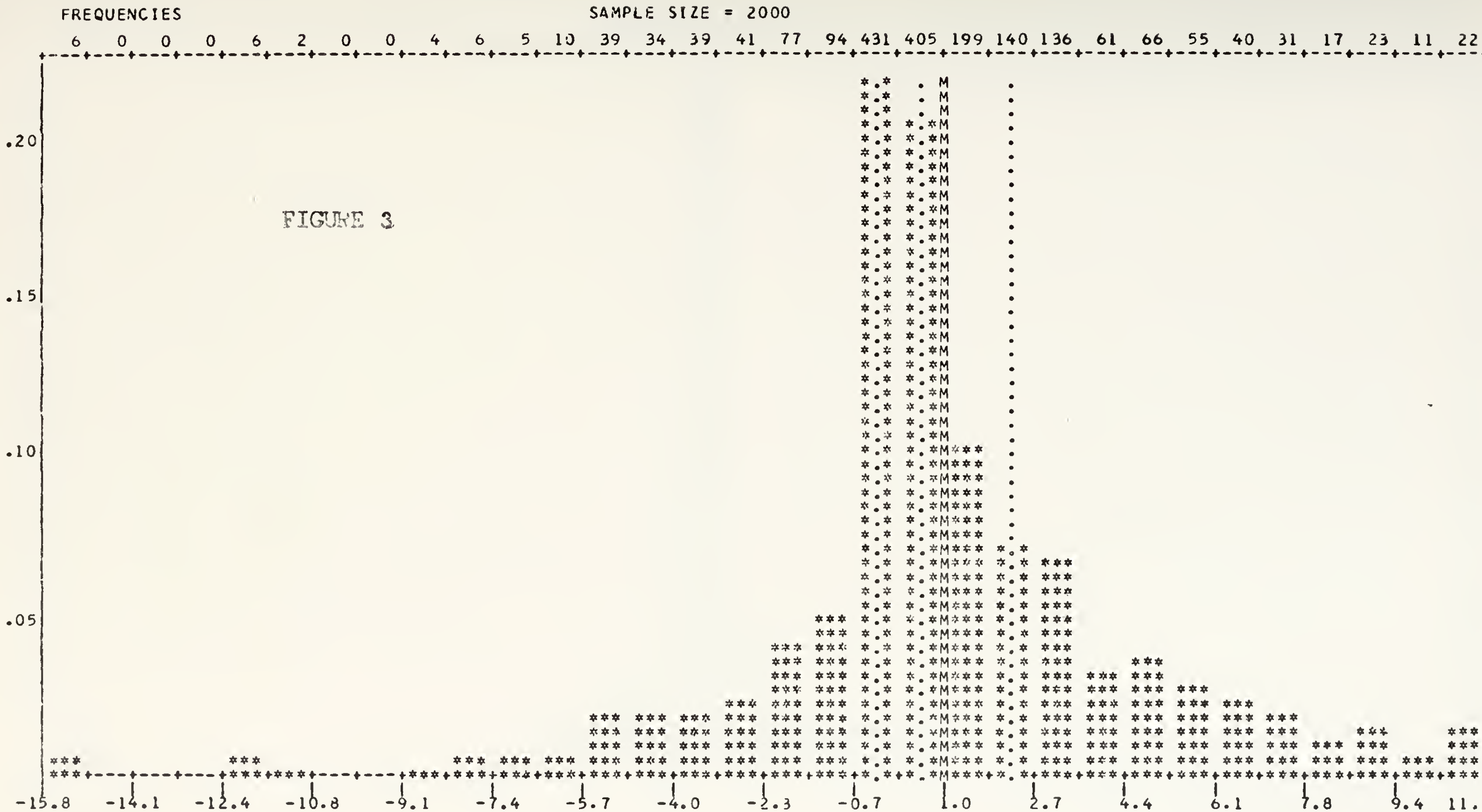


FIGURE 3

CENTRAL TENDENCY	
MEAN	1.013932E 00
MEDIAN	5.937896E-01
TRIMEAN	8.681364E-01
MIDMEAN	7.391756E-01
MIDRANGE	-2.340872E 00

SPREAD	
VARIANCE	1.073145E 01
STD DEV	3.275888E 00
COEF VAR	3.230875E 00
MEAN DEV	2.191110E 00
RANGE	2.691824E 01
MIDSPREAD	2.566143E 00

HIGHER CENTRAL MOMENTS	
M3	-5.930689E 00
M4	7.326565E 02
SKEWNESS	-1.687011E-01
KURTOSIS	3.361857E 00
BETA1	-5.921797E 00
BETA2	7.315361E 02

DISTRIBUTION	
MINIMUM	-1.580000E 01
.10 QUANTILE	-2.251930E 00
.25 QUANTILE (HINGE)	-1.405883E-01
.50 QUANTILE (MEDIAN)	5.937896E-01
.75 QUANTILE (HINGE)	2.425555E 00
.90 QUANTILE	5.211233E 00
MAXIMUM	1.111825E 01

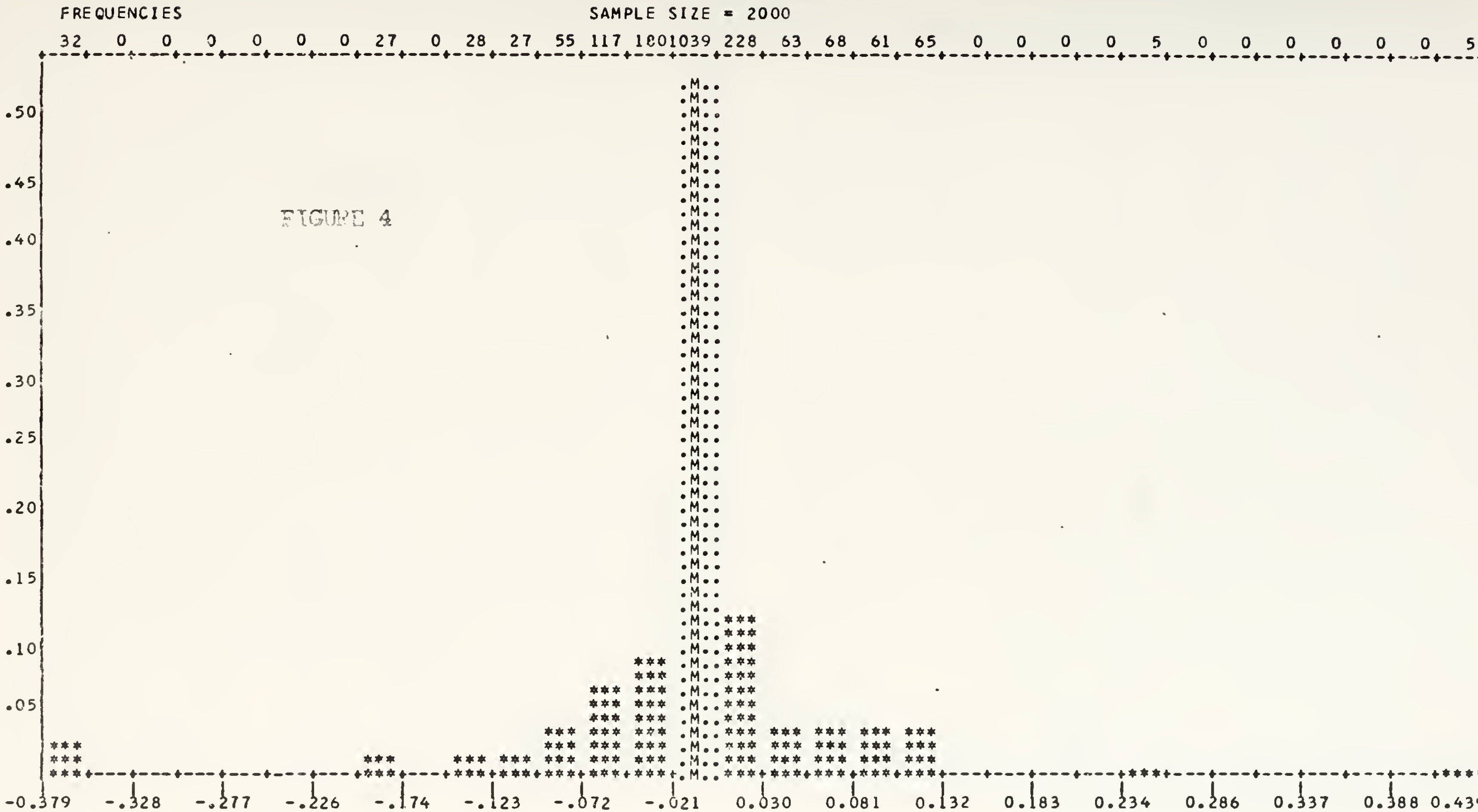


FIGURE 4

CENTRAL TENDENCY		SPREAD		HIGHER CENTRAL MOMENTS		DISTRIBUTION	
MEAN	-7.434998E-03	VARIANCE	5.176984E-03	M3	-5.764319E-04	MINIMUM	-3.789999E-01
MEDIAN	0.0	STD DEV	7.195127E-02	M4	4.457799E-04	.10 QUANTILE	-5.500000E-02
TRIMEAN	-3.000000E-03	COEF VAR	9.677376E 00	SKEWNESS	-1.547507E 00	.25 QUANTILE (HINGE)	-1.500000E-02
MIDMEAN	-2.312000E-03	MEAN DEV	3.523599E-02	KURTOSIS	1.363286E 01	.50 QUANTILE (MEDIAN)	0.0
MIDRANGE	3.000000E-02	RANGE	8.179999E-01	BETA1	-5.755676E-04	.75 QUANTILE (HINGE)	2.999999E-03
		MIDSPREAD	1.800000E-02	BETA2	4.449685E-04	.90 QUANTILE	6.999999E-02
						MAXIMUM	4.390000E-01

FIGURE 5

CENTRAL TENDENCY	
MEAN	-6.068498E-03
MEDIAN	0.0
TRIMEAN	-6.749999E-03
MIDMEAN	-5.629998E-03
MIDRANGE	6.400001E-02

SPREAD	
VARIANCE	1.399272E-02
STD DEV	1.182908E-01
COEF VAR	1.949258E 01
MEAN DEV	5.661949E-02
RANGE	1.400000E 00
MIDSPREAD	3.899999E-02

HIGHER CENTRAL MOMENTS	
M3	-8.465394E-04
M4	3.787340E-03
SKEWNESS	-5.114398E-01
KURTOSIS	1.634328E 01
BETA1	-8.452705E-04
BETA2	3.780350E-03

DISTRIBUTION	
MINIMUM	-6.360000E-01
.10 QUANTILE	-9.599996E-02
.25 QUANTILE (HINGE)	-3.299999E-02
.50 QUANTILE (MEDIAN)	0.0
.75 QUANTILE (HINGE)	5.999997E-03
.90 QUANTILE	6.799996E-02
MAXIMUM	7.640000E-01

Let

$P^*_{O/S}(n;k,t)$ = Normalized points if a marine with rank k and MOS t is assigned to RUC n,

$Q^*(n;i)$ = Normalized points if a marine with race type i is assigned to RUC n,

$R^*(n;j)$ = Normalized points if a marine with mental type j is assigned to RUC n,

$S^*(n;i,j,k,t)$ = Total normalized points when a marine with race type i, mental type j, rank k, and MOS t, is assigned to RUC n.

Then finally,

$$S^*(n;i,j,k,t) = c_1 P^*_{O/S}(n;k,t) + c_2 Q^*(n;i) + c_3 R^*(n;j),$$

where $c_1+c_2+c_3 = 1.0$.

S^* is calculated for each incoming marine for every eligible RUC n, where eligibility is determined by the requirement of MOS t by RUC n. The set of weights c_1, c_2, and c_3, used in implementing assignment policies are contained in a vector named MANWTS. For implementation purposes the values chosen were

.60 .30 .10

These values reflect a management policy whereby 60% of the assignment is based on overages and shortages, 30% on racial

distribution, and 10% on mental groups.

Since these points generated by the assignment program are not static but dynamic with respect to changes in personnel, it was decided to make the means and standard deviation easily changeable. The three sample means are stored in a vector called MEAN and the sample standard deviations are stored in a vector called SD. The first element of each vector is related to overage / shortage points, the second elements are related to race points and the third elements are related to mental group points.

As an improvement to this model it would be beneficial to design a method of dynamically changing these means and standard deviations to reflect the current status of the division.

3. Management Assignment Policies

The model incorporates many features which allow the PC&AO to directly influence assignment recommendations. These features are basically of two types, run-time options, and weight variations.

Two run-time options were written into this model. First and foremost is an option which enables the user to specify whether or not he wishes deployability to be a critical factor. As was mentioned earlier, it is not desirable to assign a marine to a unit with which he will not be deployable. There exists certain cases however, when it may be more advantageous and of more benefit to the Marine Corps to assign this marine temporarily to a unit knowing full well that he will not be deployable. Such a case may arise when the marine's previous experience or schooling becomes an overriding factor in the assignment.

To implement this feature the user is queried as to whether or not he wishes deployability to be a critical factor. If so, just prior to outputing the assignment recommendations two sorts are made. The first sort arranges the points matrix based on the normalized point totals for surplus' and shortages, race and mental group. This sort is done in descending order. A second sort is then invoked keying on the deployability factors. These factors are set to 1 if the marine is deployable and zero otherwise. The resulting points matrix thus contains in the top rows those units with which the marine is deployable arranged in order of total assignment points, and likewise at the bottom those units with which he is not deployable.

Should deployability not be critical the second sort on deployability status is eliminated thus leaving the points matrix sorted solely on normalized point totals.

The second option built into the model allows the user to specify how many assignment recommendations he desires per MOS. This allows the PC&AO in the long run to evaluate his assignment policies by examining point distributions and trends. Implementation is accomplished by simply outputting a submatrix of the points array.

Weight variation is simply a method of implementing management assignment policies. A few of these weights, such as ASSIGNWT, ALPHA, and F have previously been defined and they themselves are open to interpretation and alteration. For example, if the PC&AO feels that assignments should be based more in line with promotion trends he might be inclined to make some changes in the matrix ASSIGNWT or if he felt that large dicrepancies between the division's racial mixture and that of the individual unit are less important he might decide to reduce ALPHA thus altering the assignment characteristics.

IV. RECOMMENDATIONS AND CONCLUSIONS

A. RECOMMENDED METHODS OF IMPLEMENTATION

The Marine Corps is fortunate in that the majority of its large computer systems are produced by the same manufacturer. The major advantage obtained by this "standardization" is the ability to develop standard software with which every major computing center can easily interface. The Marine Corps has been highly successful in the development of standard software systems. Implementation of these systems would have been extremely difficult without this "standardization of equipment". This "standardization to IBM S/360" has benefitted the Marine Corps in many ways and these S/360 computers accomplish their mission quite effectively. The S/360 was designed for batch processing and its operating system is not readily adaptable to a time sharing application. An effective time sharing system requires the computer to do demand paging. Demand paging is a concept in which programs are divided into pages (normally 4096 bytes). Only those pages being used (demanded) are brought into main memory for execution. To enable a S/360 computer to have demand paging it must have a dynamic address translation (DAT) capability. The only model of the S/360 with this capability is the model 67 which is a modified S/360-65. The Marine Corps does not have any S/360-67's nor does it have anything equivalent to it. Thus the Marine Corps due to its type of equipment can not operate an effective time sharing system. At HQMC the Marine Corps operates a limited time sharing capability in which up to four users are allowed on the system at any one time. This system circumvents demand paging by assigning an area referred to as a region in main memory for time sharing. One user at a time may use this region to process for an allotted period of time. When the user's allotted time is up the next user processes his program in this same

region. This lack of machine capability has hindered the growth of time sharing applications within the Marine Corps.

The model presented in this thesis is one of many applications in the area of personnel management where a time sharing system would be of great benefit. This model can not be of benefit to anyone unless an interactive time sharing capability is made available to users such as the 2nd Marine Division.

Presented below are four possible means of providing to the 2nd Marine Division the capability to make operational the proposed computer assignment model. Included with each possible implementation method is a discussion of advantages and disadvantages which should be considered in any final implementation decision.

1. Implementation on a Commercial System

The model developed for this thesis was tested on a computer operated by the Scientific Time Sharing Corporation (STSC) located in Bethesda Maryland. As stated in II C above, STSC utilizes an advanced version of APL (APL-PLUS). By implementing this model on the STSC computer system, it is estimated that the cost per assignment would be somewhere around \$1.12 based upon 1000 assignments per month for the 2nd Marine Division. This cost per assignment is estimated in the following fashion:

Storage time	.08
Updating data	.10
CPU time	.30
Connect time	.44
Terminal rental	.20
	\$1.12

The system at STSC is a modern and up to date computer system and it is larger and many times faster than any computer system currently in use by the Marine Corps. The STSC system has several advantages that make it a very good means of implementing this model. These advantages are listed below:

a. The STSC system is based on a S/370 model 168 and consequently operates extremely fast. The execution of an assignment using our model takes about one half of a second and the printing of the results takes about thirty-five seconds on a terminal capable of printing at 30 characters per second.

b. The STSC system can operate at various communications rates and one means of implementing this model would be using a visual display terminal, which would allow an assignment to be displayed instantaneously.

c. The STSC system is available during the time period 0800 to 2400.

2. Implementation at HQMC

One of the reasons that this model was implemented on the STSC computer was that HQMC has the same version of APL and therefore this model could be implemented on the HQMC computer system with ease. The cost of implementing this model on the HQMC computer is difficult to estimate since all of the costs would be indirect. The HQMC system only allows four time shared users at any one time and only during the time period 0800 through 1700. The addition of a major user like the 2d Marine Division would be a heavy burden upon the HQMC time sharing system.

3. Implementation on a Functional Computer

Presently the major center for personnel accounting is located at Kansas City, Missouri, which operates the largest Marine Corps computer system. Several years ago Kansas City requested that they be upgraded to a S/370 but they were denied. This method of implementation proposes upgrading the Kansas City computer system as previously requested to a large scale, fourth generation computer, such as the S/370, model 158. This particular computer system is many times faster than the present system. With this computer system there would be the capability and available computer time to develop a time sharing system. This time sharing system could be functional in nature and oriented solely toward personnel applications. The system could be used by every command within the Marine Corps to assign personnel using a form of this model. Additionally this system would allow the developement of other time sharing applications for Marine Corps personnel.

If the Kansas City computer system were upgraded to a large scale, fourth generation computer then the Marine Corps would obtain every advantage that the STSC computer system discussed above currently has.

The cost of upgrading to a large scale, fourth generation computer would be substantial. Upgrading to a S/370-158 for example, would cost around 1.934 million dollars, but this would release their present three computers which could be re-utilized within the Marine Corps.

4. Implementation on a Mini-Computer

This model could be implemented on a mini-computer

system however it would require that the interactive assignment portion be reprogrammed as no known mini-computers are capable of executing the APL language. The mini-computer is a reasonably priced solution for implementation of this model, as such a system capable of executing this model could be purchased somewhere in the range of twenty to thirty thousand dollars. The mini-computer concept would allow an assignment to be made at any time of day, however the speed of each assignment would be slower than each of the above three means.

A mini-computer implementation is consistant with the design objectives set forth in the Marine Integrated Personnel System (MIPS) as a means of meeting Marine Corps needs in the 1980's (see references 4 and 5).

B. CONCLUSIONS

A computer-assisted personnel assignment system provides a reasonable means whereby management can test the effect of various policy decisions on the assignment system as a whole. Since this model exposes each incoming marine to all reporting units with which he is eligible for assignment the probability of assigning that marine to the "best" billet available is greatly enhanced. It is recommended that the 2nd Marine Division implement this model on the Scientific Time Sharing Corporation computer system for a long enough period of time to evaluate its effectiveness. If the model is deemed worthwhile then another means of implementing the model within the Marine Corps should be explored (2,3,4 above).

```
      ASSIGN

DO YOU WISH DEPLOYABILITY TO BE A CRITICAL FACTOR, (Y,N)?
YES

HOW MANY ASSIGNMENT CHOICES DO YOU DESIRE PER MOS?
⎕:
      4

SSN?
⎕:
      248881825

        LAST NAME     INITIALS     SOC-SEC-NO     RANK     RACE
        0248881825                 248-88-1825     E-1      N

          PMOS      SMOS      TMOS      GCT      ED-LEVEL      MAJ-SUB
          0311      0000      0000       89         1            10

        FORMER-MCC       MARRIED/SINGLE        EAS
           122               MARRIED          4/ 4/76

        SCHOOLS
          122    000    000    000
          000    000    000    000
```

BEST ASSIGNMENTS FOR MOS-0311

RUC	OH/TO	RACE	ED-LEV	TOTAL	DEPLOYABLE
12227	18.61	¯0.34	¯0.19	18.08	1
12124	19.46	¯0.67	¯0.77	18.03	1
12301	10.66	4.29	0.86	15.80	1
12226	14.59	0.00	¯0.15	14.43	1

```
CONTINUE,(Y,N)?
YES
SSN?
⎕:
      1460218
```

LAST NAME	INITIALS	SOC-SEC-NO	RANK	RACE
0001460218		1-46-0218	E-5	C

PMOS	SMOS	TMOS	GCT	ED-LEVEL	MAJ-SUB
0811	0000	0000	105	1	11

FORMER-MCC	MARRIED/SINGLE	EAS
122	MARRIED	7/ 3/76

SCHOOLS

000	000	000	000
000	000	000	000

BEST ASSIGNMENTS FOR MOS-0811

RUC	OH/TO	RACE	ED-LEV	TOTAL	DEPLOYABLE
12334	3.88	2.14	-0.09	5.92	1
12333	3.94	0.31	-0.05	4.20	1
12325	2.71	1.46	-0.05	4.12	1
12323	3.49	0.28	-0.05	3.72	1

```
CONTINUE,(Y,N)?
YES
SSN?
⎕:
      3462587

     LAST NAME     INITIALS     SOC-SEC-NO     RANK     RACE
     0003462587                  3-46-2587      E-3      C

      PMOS     SMOS     TMOS     GCT     ED-LEVEL     MAJ-SUB
      0131     0151     0000     109        1           12

     FORMER-MCC     MARRIED/SINGLE     EAS
        016             MARRIED       9/ 5/77

     SCHOOLS
      01F     01S     01T     000
      000     000     000     000
```

BEST ASSIGNMENTS FOR MOS-0131

RUC	OH/TO	RACE	ED-LEV	TOTAL	DEPLOYABLE
12194	¯1.77	18.63	¯0.74	16.13	1
12193	¯1.77	10.44	¯0.62	8.05	1
12652	¯0.86	4.81	¯0.05	3.90	1
12235	¯0.86	¯0.72	5.33	3.75	1

BEST ASSIGNMENTS FOR MOS-0151

RUC	OH/TO	RACE	ED-LEV	TOTAL	DEPLOYABLE
12341	2.15	5.13	¯1.13	6.15	1
12012	2.85	5.44	¯3.08	5.22	1
12311	¯0.08	3.49	¯0.33	3.08	1
12401	¯0.80	3.96	¯0.12	3.04	1

```
CONTINUF,(Y,N)?
YES
SSN?
⎕:
      320481157

        LAST NAME      INITIALS      SOC-SEC-NO     RANK      RACE
        0320481157                   320-48-1157     E-3        C

          PMOS      SMOS      TMOS      GCT      ED-LEVEL      MAJ-SUB
          0311      0000      0000      100          1            99

        FORMER-MCC      MARRIED/SINGLE          EAS
           014              MARRIED           1/15/77

        SCHOOLS
          031    000    000    000
          000    000    000    000


     BEST ASSIGNMENTS FOR MOS-0311

        RUC         OH/TO         RACE         ED-LEV         TOTAL      DEPLOYABLE

       12124        22.76        ¯0.67          0.77          22.87          1
       12301         4.80         4.29         ¯0.86           8.23          1
       12175         6.81        ¯1.98          0.27           5.09          1
       12187         5.85        ¯1.35          0.48           4.98          1
```

```
CONTINUE,(Y,N)?
NO
      ASSIGN


DO YOU WISH DEPLOYABILITY TO BE A CRITICAL FACTOR, (Y,N)?
NO


HOW MANY ASSIGNMENT CHOICES DO YOU DESIRE PER MOS?
⎕:
      5


SSN?
⎕:
      19467569


        LAST NAME      INITIALS      SOC-SEC-NO     RANK      RACE
        0019467569                   19-46-7569      E-1       C


          PMOS       SMOS       TMOS       GCT       ED-LEVEL       MAJ-SUB
          2500       0000       0000       104          1             10


        FORMER-MCC       MARRIED/SINGLE         EAS
           W95               MARRIED          11/17/78


        SCHOOLS
          000    000    000    000
          000    000    000    000
```

```
PRIMARY MOS.2500
NEW PRIMARY MOS?
⎕:
      2511


   BEST ASSIGNMENTS FOR MOS-2511


      RUC          OH/TO         RACE          ED-LEV         TOTAL      DEPLOYABLE


      12221        15.57         3.22          ¯0.29          18.50          1
      12341         3.12         5.13          ¯1.13           7.12          1
      12335         3.57         1.74          ¯0.22           5.10          1
      12334         2.49         2.14          ¯0.09           4.53          1
      12314         4.17         0.33          ¯0.05           4.45          1

CONTINUE,(Y,N)?
YES
SSN?
⎕:
      1443393

        LAST NAME      INITIALS       SOC-SEC-NO      RANK      RACE
        0001443393                     1-44-3393       E-3       C

          PMOS       SMOS       TMOS       GCT      ED-LEVEL      MAJ-SUB
          0844       0000       0000       125         1            12
```

FORMER-MCC	MARRIED/SINGLE	EAS
014	MARRIED	9/23/77

SCHOOLS

081	000	000	000
000	000	000	000

BEST ASSIGNMENTS FOR MOS-0844

RUC	OH/TO	RACE	ED-LEV	TOTAL	DEPLOYABLE
12341	11.50	5.13	¯1.13	15.50	1
12311	5.39	3.49	¯0.33	8.55	1
12331	5.15	1.05	¯0.59	5.60	0
12325	2.01	1.46	¯0.05	3.42	1
12323	2.82	0.28	¯0.05	3.05	1

```
CONTINUE.(Y,N)?
YES
SSN?
⎕:
      132424180
SSN NOT FOUND
PRIMARY MOS?
⎕:
      0369
DO YOU HAVE A 2ND MOS?
YES
2ND MOS?
⎕:
      2861
3RD MOS?
⎕:
      0000
RANK, (1-9)?
⎕:
      8
ENTER EAS  (MM DD YY).
⎕:
      12 25 77
```

BEST ASSIGNMENTS FOR MOS-0369

RUC	OH/TO	RACE	ED-LEV	TOTAL	DEPLOYABLE
12235	¯1.77	¯0.72	5.33	2.84	1
12221	¯1.06	3.22	¯0.29	1.87	1
12301	¯1.86	4.29	¯0.86	1.57	1
12171	0.03	0.52	¯0.06	0.49	1
12111	0.12	0.31	¯0.05	0.38	1

BEST ASSIGNMENTS FOR MOS-2861

RUC	OH/TO	RACE	ED-LEV	TOTAL	DEPLOYABLE
12301	¯1.95	4.29	¯0.86	1.48	1
12221	¯1.86	3.22	¯0.29	1.07	1
12672	¯1.77	3.31	¯0.54	1.00	1
12012	¯1.77	5.44	¯3.08	0.60	1
12191	¯1.86	3.72	¯2.19	¯0.33	1

CONTINUE,(Y,N)?
NO

```
//SIMS1&2  JOB  (2204,0770,CS42),'SIMS',TIME=4
//STEP1  EXEC  COBUCLG
//COB.SYSIN  DD  *

*****************************************************************************
*                                                                           *
*       STEP1 PROCESSES THE TABLE OF MANPOWER REQUIREMENTS (TMR)            *
*       FILE TO EXTRACT THOSE TMR'S WHICH ARE ASSOCIATED WITH THE           *
*       2D MARINE DIVISION.  THE PROCESS WOULD BE THE SAME FOR ANY UNIT     *
*       EXCEPT THAT THE TWO TABLES IN WORKING-STORAGE WOULD HAVE            *
*       DIFFERENT VALUES.  IT IS IMPORTANT TO NOTE THAT IF THE 2D           *
*       DIVISION WERE TO BE REDUCED TO OPERATE AT 95%. THEN A VERY          *
*       SLIGHT MODIFICATION OF THE FILE DESCRIPTION WOULD YEILD RESULTS     *
*       BASED UPON MANNING BILLETS AT 95%.  IT SHOULD ALSO BE NOTED         *
*       THAT HEADQUARTERS COMPANY OF HEADQUARTERS BATTALION HAD TWO TMR     *
*       NUMBERS ASSOCIATED WITH IT (1986M AND 1987M).  THESE TWO TMR'S      *
*       HAD TO BE COMBINED IN STEPS 2&3.                                    *
*                                                                           *
*****************************************************************************

       IDENTIFICATION DIVISION.
       PROGRAM-ID.  TMR-REDUCTION.
       ENVIRONMENT DIVISION.
       CONFIGURATION SECTION.
       SOURCE-COMPUTER.  IBM-360-67.
       OBJECT-COMPUTER.  IBM-360-67.

       INPUT-OUTPUT SECTION.
       FILE-CONTROL.
           SELECT TMR-TAPE1 ASSIGN TO  UT-2400-S-FILE1.
           SELECT TMR-OUTPUT        ASSIGN TO UT-S-TMR.


       DATA DIVISION.
       FILE SECTION.
       FD  TMR-TAPE1
           BLOCK CONTAINS 7 RECORDS
           RECORD CONTAINS 928 CHARACTERS
           LABEL RECORDS ARE OMITTED
           DATA RECORD IS TAPE1.
       01  TAPE1.
           02  TMR-NO              PIC        X(5).
           02  MOS                 PIC        X(4).
```

```
    02  FILLER          PIC        X.
    02  BRANCH          PIC        X.
    02  TIPE            PIC        X.
    02  STATIS          PIC        X.
    02  FILLER          PIC        X.
    02  TMR-100.
        03  FILLER      PIC        X(36).
        03  FILLER      PIC        X(4).
        03  E9          PIC        S9(7)       COMP-3.
        03  E8          PIC        S9(7)       COMP-3.
        03  E7          PIC        S9(7)       COMP-3.
        03  E6          PIC        S9(7)       COMP-3.
        03  E5          PIC        S9(7)       COMP-3.
        03  E4          PIC        S9(7)       COMP-3.
        03  E3          PIC        S9(7)       COMP-3.
        03  E2-E1       PIC        S9(7)       COMP-3.
        03  TOTAL       PIC        S9(7)       COMP-3.
02  TMR-97              PIC        X(76).
02  TMR-95              PIC        X(76).
02  TMR-93              PIC        X(76).
02  TMR-90              PIC        X(76).
02  TMR-87              PIC        X(76).
02  TMR-85              PIC        X(76).
02  TMR-83              PIC        X(76).
02  TMR-80              PIC        X(76).
02  TMR-78              PIC        X(76).
02  TMR-75              PIC        X(76).
02  TMR-70              PIC        X(76).
02  DES-CODE            PIC        X(2).
FD  TMR-OUTPUT
    LABEL RECORDS ARE STANDARD
    DATA RECORD IS PRINT-LINE.
01  PRINT-LINE          PIC        X(80).
WORKING-STORAGE SECTION.
77  I        PIC     99999.
77  ENLISTED        PIC   X        VALUE       'E'.
77  MARINE          PIC   X        VALUE       'M'.
77  FLAG            PIC   999.
77  COMBAT   PIC       X     VALUE  'C'.
77  COMSAT   PIC       X     VALUE  'S'.
01  TEMP-RECORD.
    02  MOS             PIC        X(4).
        02  FILLER      PIC        X(1).
    02  CO-RUC          PIC        X(5).
        02  FILLER      PIC        X(1).
    02  TMR-NO          PIC        X(5).
        02  FILLER      PIC        X(1).
    02  RANK.
```

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           03  FILLER      PIC        X(4).
           03  E9          PIC        9(3).
           03  FILLER      PIC        X(4).
           03  E8          PIC        9(3).
           03  FILLER      PIC        X(4).
           03  E7          PIC        9(3).
           03  FILLER      PIC        X(4).
           03  E6          PIC        9(3).
           03  FILLER      PIC        X(4).
           03  E5          PIC        9(3).
           03  FILLER      PIC        X(4).
           03  E4          PIC        9(3).
           03  FILLER      PIC        X(4).
           03  E3          PIC        9(3).
           03  FILLER      PIC        X(4).
           03  E2-E1       PIC        9(3).
           03  FILLER      PIC        X(4).
           03  TOTAL       PIC        9(3).
 01    BN-TMR-TABLE-VALUES.
       02  FILLER   PIC   X(5)        VALUE      '1903M'.
       02  FILLER   PIC   X(5)        VALUE      '1985M'.
       02  FILLER   PIC   X(5)        VALUE      '1883M'.
       02  FILLER   PIC   X(5)        VALUE      '1986M'.
       02  FILLER   PIC   X(5)        VALUE      '1987M'.
       02  FILLER   PIC   X(5)        VALUE      '1557M'.
       02  FILLER   PIC   X(5)        VALUE      '1523M'.
       02  FILLER   PIC   X(5)        VALUE      '1523M'.
       02  FILLER   PIC   X(5)        VALUE      '1523M'.
       02  FILLER   PIC   X(5)        VALUE      '1523M'.
       02  FILLER   PIC   X(5)        VALUE      '1096M'.
       02  FILLER   PIC   X(5)        VALUE      '1037M'.
       02  FILLER   PIC   X(5)        VALUE      '1013M'.
       02  FILLER   PIC   X(5)        VALUE      '1013M'.
       02  FILLER   PIC   X(5)        VALUE      '1013M'.
       02  FILLER   PIC   X(5)        VALUE      '1013M'.
       02  FILLER   PIC   X(5)        VALUE      '1037M'.
       02  FILLER   PIC   X(5)        VALUE      '1013M'.
       02  FILLER   PIC   X(5)        VALUE      '1013M'.
       02  FILLER   PIC   X(5)        VALUE      '1013M'.
       02  FILLER   PIC   X(5)        VALUE      '1013M'.
       02  FILLER   PIC   X(5)        VALUE      '1037M'.
       02  FILLER   PIC   X(5)        VALUE      '1013M'.
       02  FILLER   PIC   X(5)        VALUE      '1013M'.
       02  FILLER   PIC   X(5)        VALUE      '1013M'.
       02  FILLER   PIC   X(5)        VALUE      '1013M'.
       02  FILLER   PIC   X(5)        VALUE      '1096M'.
       02  FILLER   PIC   X(5)        VALUE      '1037M'.
       02  FILLER   PIC   X(5)        VALUE      '1013M'.
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02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1037M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1037M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1427M'.
02  FILLER  PIC  X(5)  VALUE  '1423M'.
02  FILLER  PIC  X(5)  VALUE  '1423M'.
02  FILLER  PIC  X(5)  VALUE  '1423M'.
02  FILLER  PIC  X(5)  VALUE  '1096M'.
02  FILLER  PIC  X(5)  VALUE  '1037M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1037M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1037M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1013M'.
02  FILLER  PIC  X(5)  VALUE  '1196X'.
02  FILLER  PIC  X(5)  VALUE  '1126M'.
02  FILLER  PIC  X(5)  VALUE  '1103M'.
02  FILLER  PIC  X(5)  VALUE  '1103M'.
02  FILLER  PIC  X(5)  VALUE  '1103M'.
02  FILLER  PIC  X(5)  VALUE  '1126M'.
02  FILLER  PIC  X(5)  VALUE  '1103M'.
02  FILLER  PIC  X(5)  VALUE  '1103M'.
02  FILLER  PIC  X(5)  VALUE  '1103M'.
02  FILLER  PIC  X(5)  VALUE  '1126M'.
02  FILLER  PIC  X(5)  VALUE  '1103M'.
02  FILLER  PIC  X(5)  VALUE  '1103M'.
02  FILLER  PIC  X(5)  VALUE  '1103M'.
02  FILLER  PIC  X(5)  VALUE  '1136M'.
02  FILLER  PIC  X(5)  VALUE  '1133M'.
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           02  FILLER   PIC   X(5)      VALUE     '1133M'.
           02  FILLER   PIC   X(5)      VALUE     '1133M'.
           02  FILLER   PIC   X(5)      VALUE     '1377M'.
           02  FILLER   PIC   X(5)      VALUE     '1373M'.
           02  FILLER   PIC   X(5)      VALUE     '1373M'.
           02  FILLER   PIC   X(5)      VALUE     '1373M'.
           02  FILLER   PIC   X(5)      VALUE     '1363M'.
           02  FILLER   PIC   X(5)      VALUE     '1867M'.
           02  FILLER   PIC   X(5)      VALUE     '1863M'.
           02  FILLER   PIC   X(5)      VALUE     '1863M'.
           02  FILLER   PIC   X(5)      VALUE     '1863M'.
           02  FILLER   PIC   X(5)      VALUE     '1657M'.
           02  FILLER   PIC   X(5)      VALUE     '1653M'.
           02  FILLER   PIC   X(5)      VALUE     '1653M'.
           02  FILLER   PIC   X(5)      VALUE     '1653M'.
           02  FILLER   PIC   X(5)      VALUE     '1757M'.
           02  FILLER   PIC   X(5)      VALUE     '1753M'.
           02  FILLER   PIC   X(5)      VALUE     '1733M'.
           02  FILLER   PIC   X(5)      VALUE     '1743M'.
       01  BN-TMR-TABLE REDEFINES BN-TMR-TABLE-VALUES.
           02  BN-TMR     PIC   X(5)   OCCURS  95 TIMES.
       01  RUC-TABLE-VALUES.
       02  FILLER    PIC    X(5)    VALUE    '12003'.
       02  FILLER    PIC    X(5)    VALUE    '12008'.
       02  FILLER    PIC    X(5)    VALUE    '12010'.
       02  FILLER    PIC    X(5)    VALUE    '12012'.
       02  FILLER    PIC    X(5)    VALUE    '12012'.
       02  FILLER    PIC    X(5)    VALUE    '12021'.
       02  FILLER    PIC    X(5)    VALUE    '12022'.
       02  FILLER    PIC    X(5)    VALUE    '12023'.
       02  FILLER    PIC    X(5)    VALUE    '12024'.
       02  FILLER    PIC    X(5)    VALUE    '12025'.
       02  FILLER    PIC    X(5)    VALUE    '12101'.
       02  FILLER    PIC    X(5)    VALUE    '12111'.
       02  FILLER    PIC    X(5)    VALUE    '12113'.
       02  FILLER    PIC    X(5)    VALUE    '12114'.
       02  FILLER    PIC    X(5)    VALUE    '12115'.
       02  FILLER    PIC    X(5)    VALUE    '12116'.
       02  FILLER    PIC    X(5)    VALUE    '12121'.
       02  FILLER    PIC    X(5)    VALUE    '12124'.
       02  FILLER    PIC    X(5)    VALUE    '12125'.
       02  FILLER    PIC    X(5)    VALUE    '12126'.
       02  FILLER    PIC    X(5)    VALUE    '12127'.
       02  FILLER    PIC    X(5)    VALUE    '12131'.
       02  FILLER    PIC    X(5)    VALUE    '12135'.
       02  FILLER    PIC    X(5)    VALUE    '12136'.
       02  FILLER    PIC    X(5)    VALUE    '12137'.
       02  FILLER    PIC    X(5)    VALUE    '12138'.
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02   FILLER   PIC   X(5)   VALUE   '12151'.
02   FILLER   PIC   X(5)   VALUE   '12161'.
02   FILLER   PIC   X(5)   VALUE   '12163'.
02   FILLER   PIC   X(5)   VALUE   '12164'.
02   FILLER   PIC   X(5)   VALUE   '12165'.
02   FILLER   PIC   X(5)   VALUE   '12166'.
02   FILLER   PIC   X(5)   VALUE   '12171'.
02   FILLER   PIC   X(5)   VALUE   '12174'.
02   FILLER   PIC   X(5)   VALUE   '12175'.
02   FILLER   PIC   X(5)   VALUE   '12176'.
02   FILLER   PIC   X(5)   VALUE   '12177'.
02   FILLER   PIC   X(5)   VALUE   '12181'.
02   FILLER   PIC   X(5)   VALUE   '12185'.
02   FILLER   PIC   X(5)   VALUE   '12186'.
02   FILLER   PIC   X(5)   VALUE   '12187'.
02   FILLER   PIC   X(5)   VALUE   '12188'.
02   FILLER   PIC   X(5)   VALUE   '12191'.
02   FILLER   PIC   X(5)   VALUE   '12192'.
02   FILLER   PIC   X(5)   VALUE   '12193'.
02   FILLER   PIC   X(5)   VALUE   '12194'.
02   FILLER   PIC   X(5)   VALUE   '12201'.
02   FILLER   PIC   X(5)   VALUE   '12211'.
02   FILLER   PIC   X(5)   VALUE   '12213'.
02   FILLER   PIC   X(5)   VALUE   '12214'.
02   FILLER   PIC   X(5)   VALUE   '12215'.
02   FILLER   PIC   X(5)   VALUE   '12216'.
02   FILLER   PIC   X(5)   VALUE   '12221'.
02   FILLER   PIC   X(5)   VALUE   '12224'.
02   FILLER   PIC   X(5)   VALUE   '12225'.
02   FILLER   PIC   X(5)   VALUE   '12226'.
02   FILLER   PIC   X(5)   VALUE   '12227'.
02   FILLER   PIC   X(5)   VALUE   '12231'.
02   FILLER   PIC   X(5)   VALUE   '12235'.
02   FILLER   PIC   X(5)   VALUE   '12236'.
02   FILLER   PIC   X(5)   VALUE   '12237'.
02   FILLER   PIC   X(5)   VALUE   '12238'.
02   FILLER   PIC   X(5)   VALUE   '12301'.
02   FILLER   PIC   X(5)   VALUE   '12311'.
02   FILLER   PIC   X(5)   VALUE   '12313'.
02   FILLER   PIC   X(5)   VALUE   '12314'.
02   FILLER   PIC   X(5)   VALUE   '12315'.
02   FILLER   PIC   X(5)   VALUE   '12321'.
02   FILLER   PIC   X(5)   VALUE   '12323'.
02   FILLER   PIC   X(5)   VALUE   '12324'.
02   FILLER   PIC   X(5)   VALUE   '12325'.
02   FILLER   PIC   X(5)   VALUE   '12331'.
02   FILLER   PIC   X(5)   VALUE   '12333'.
02   FILLER   PIC   X(5)   VALUE   '12334'.
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02  FILLER   PIC   X(5)   VALUE   '12335'.
02  FILLER   PIC   X(5)   VALUE   '12341'.
02  FILLER   PIC   X(5)   VALUE   '12343'.
02  FILLER   PIC   X(5)   VALUE   '12344'.
02  FILLER   PIC   X(5)   VALUE   '12345'.
02  FILLER   PIC   X(5)   VALUE   '12401'.
02  FILLER   PIC   X(5)   VALUE   '12403'.
02  FILLER   PIC   X(5)   VALUE   '12404'.
02  FILLER   PIC   X(5)   VALUE   '12405'.
02  FILLER   PIC   X(5)   VALUE   '12407'.
02  FILLER   PIC   X(5)   VALUE   '12551'.
02  FILLER   PIC   X(5)   VALUE   '12552'.
02  FILLER   PIC   X(5)   VALUE   '12553'.
02  FILLER   PIC   X(5)   VALUE   '12554'.
02  FILLER   PIC   X(5)   VALUE   '12651'.
02  FILLER   PIC   X(5)   VALUE   '12652'.
02  FILLER   PIC   X(5)   VALUE   '12653'.
02  FILLER   PIC   X(5)   VALUE   '12654'.
02  FILLER   PIC   X(5)   VALUE   '12661'.
02  FILLER   PIC   X(5)   VALUE   '12670'.
02  FILLER   PIC   X(5)   VALUE   '12671'.
02  FILLER   PIC   X(5)   VALUE   '12672'.
01  RUC-TABLE REDEFINES RUC-TABLE-VALUES.
    02  RUC  PIC  X(5)  OCCURS  95 TIMES.

PROCEDURE DIVISION.
INITIALIZATION SECTION.
    OPEN INPUT TMR-TAPE1.
    OPEN OUTPUT TMR-OUTPUT.
    MOVE SPACES TO TEMP-RECORD.
MAIN-LINE SECTION.
TAPE-ONE.
    READ TMR-TAPE1, AT END GO TO EOJ.
    IF TIPE OF TAPE1 IS NOT EQUAL TO ENLISTED GO TO TAPE-ONE.
    IF BRANCH OF TAPE1 IS NOT EQUAL TO MARINE GO TO TAPE-ONE.
    IF STATIS OF TAPE1 IS EQUAL TO COMBAT GO TO TAPE-ONE.
    IF STATIS OF TAPE1 IS EQUAL TO COMSAT GO TO TAPE-ONE.
    IF TMR-NO OF TAPE1 IS GREATER THAN 20000 GO TO EOJ.
    MOVE 1 TO I.
FIND-CO.
    IF TMR-NO OF TAPE1 IS EQUAL TO BN-TMR (I), PERFORM P-CARD.
    ADD 1 TO I.
    IF I IS EQUAL TO 97, GO TO TAPE-ONE.
    GO TO FIND-CO.
P-CARD.
    MOVE RUC (I) TO CO-RUC OF TEMP-RECORD.
    MOVE CORRESPONDING TAPE1 TO TEMP-RECORD.
```

```
            MOVE CORRESPONDING TMR-100 OF TAPE1 TO RANK.
            MOVE TEMP-RECORD TO PRINT-LINE.
            WRITE PRINT-LINE.
        EOJ.
            CLOSE TMR-TAPE1 WITH DISP.
            CLOSE TMR-OUTPUT.
            STOP RUN.
//GO.FILE1  DD UNIT=2400,VOL=SER=HQMC1,DISP=(OLD,KEEP),LABEL=(2,BLP),
//     DCB=(RECFM=FB,LRECL=928,BLKSIZE=6496)
//GO.TMR  DD  UNIT=SYSDA,DCB=(RECFM=FB,LRECL=80,BLKSIZE=800),
//        DSN=TMROUT,DISP=(NEW,PASS),SPACE=(CYL,(3,1))
*/
```

```
******************************************************************************
**                                                                          **
**                                                                          **
**       STEP2 IS A SIMPLE UTILITY SORT WHICH PUTS THE RESULTS              **
**       OF STEP 1 INTO MOS MAJOR SEQUENCE, WITH RUC MINOR SEQUENCE.        **
**                                                                          **
**                                                                          **
******************************************************************************

//STEP2   EXEC PGM=IERRC000,REGION=50K
//SYSOUT   DD  SYSOUT=A
//SORTPR   DD  SYSOUT=A,SPACE=(TRK,(2))
//SORTLIB   DD DSN=SYS1.SORTLIB,DISP=SHR
//SORTIN   DD  DSNAME=TMROUT,DISP=(OLD,PASS),DCB=(RECFM=FB,
//        LRECL=80,BLKSIZE=800)
//SORTOUT   DD  DSN=S2204.TMR1,DISP=(NEW,KEEP),DCB=(RECFM=FB,LRECL=80,
//     BLKSIZE=800),SPACE=(CYL,(3,1)),VOL=SER=CEL002,UNIT=2321,
//     LABEL=EXPDT=75200
//SORTWK01   DD  UNIT=SYSDA,SPACE=(CYL,(2),,CONTIG)
//SORTWK02   DD  UNIT=SYSDA,SPACE=(CYL,(2),,CONTIG)
//SCRTWK03   DD  UNIT=SYSDA,SPACE=(CYL,(2),,CONTIG)
//SORTWK04   DD  UNIT=SYSDA,SPACE=(CYL,(2),,CONTIG)
//SORTWK05   DD  UNIT=SYSDA,SPACE=(CYL,(2),,CONTIG)
//SORTWK06   DD  UNIT=SYSDA,SPACE=(CYL,(2),,CONTIG)
//SYSIN  DD  *
  SORT FIELDS=(1,4,CH,A,6,5,CH,A),SIZE=E2000
*/
```

```
//SIMS3     JOB  (2204,0770,CS42),'SIMS'
//STEP3  EXEC FORTCLG,REGION=150K
//FORT.SYSIN   DD  *
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                        C
C         STEP3 COMPARES EACH TMR WITH THE NEXT TMR AND IF THEY ARE      C
C         FOR THE SAME MOS AND RUC THE TWO TMR'S ARE COMBINED.  THIS     C
C         IS SPECIFICALLY DESIGNED TO COMBINE THE TWO TMR'S WHICH        C
C         COMPOSE HEADQUARTERS COMPANY OF HEADQUARTERS BATTALION.        C
C                                                                        C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
      IMPLICIT  INTEGER*2 (A-H,M-Z)
      DIMENSION  MOS(2000),RUC(2000),E9(2000),E8(2000),E7(2000)
      DIMENSION  E6(2000),E5(2000),E4(2000),E3(2000),E2E1(2000)
      DIMENSION  TOTAL(2000)
      DO 77 I=1,2000
   77 RUC(I)=0
      I=0
   90 I=I+1
      READ (5,100,END=7) MOS(I),RUC(I),E9(I),E8(I),E7(I),E6(I),E5(I),
     X  E4(I),E3(I),E2E1(I),TOTAL(I)
  100 FORMAT (I4,1X,I5,7X,9(4X,I3))
      GO TO 90
    7 CCUNT=I-1
      DO 80 J=1,1999
      IF (MOS(J).NE.MOS(J+1)) GO TO 80
      IF (RUC(J).NE.RUC(J+1)) GO TO 80
      IF (RUC(J).EQ.0) GO TO 80
      E9(J)=E9(J)+E9(J+1)
      E8(J)=E8(J)+E8(J+1)
      E7(J)=E7(J)+E7(J+1)
      E6(J)=E6(J)+E6(J+1)
      E5(J)=E5(J)+E5(J+1)
      E4(J)=E4(J)+E4(J+1)
      E3(J)=E3(J)+E3(J+1)
      E2E1(J)=E2E1(J)+E2E1(J+1)
      TOTAL(J)=TOTAL(J)+TOTAL(J+1)
      N=J+1
      DO 70 K=N,1999
      MOS(K)=MOS(K+1)
      RUC(K)=RUC(K+1)
      E9(K)=E9(K+1)
      E8(K)=E8(K+1)
      E7(K)=E7(K+1)
      E6(K)=E6(K+1)
      E5(K)=E5(K+1)
```

```
      E4(K)=E4(K+1)
      E3(K)=E3(K+1)
      E2E1(K)=E2E1(K+1)
      TOTAL(K)=TOTAL(K+1)
   70 CONTINUE
      CCUNT=COUNT-1
   80 CONTINUE
      WRITE (9,201) COUNT
  201 FORMAT (1X,I5)
      DO 60 I=1,COUNT
      WRITE (9,200)       MOS(I),RUC(I),E9(I),E8(I),E7(I),E6(I),E5(I),
     X  E4(I),E3(I),E2E1(I),TOTAL(I)
  200 FORMAT (1X,I4,1X,I5,9(2X,I3))
   60 CONTINUE
      STOP
      END
//GO.SYSIN   DD   DSN=S2204.TMR1,DISP=(OLD,KEEP),LABEL=(,,,IN),
//       UNIT=2321,VOL=SER=CEL002
//FT09F001 DD  DSN=S2204.TMR9,DISP=(NEW,KEEP),DCB=(RECFM=FB,LRECL=80,
//     BLKSIZE=800),SPACE=(CYL,(3,1)),VOL=SER=CEL002,UNIT=2321,
//     LABEL=EXPDT=75200
*/
```

```
//SIMS4   JOB   (2204,0770,CS42),'SIMS'
//STEP4   EXEC   COBUCLG,REGION=150K
//COB.SYSIN   DD   *

*****************************************************************************
*                                                                           *
*        STEP4 USES A 1200 BYTE MMS RECORD AS INPUT AND EXTRACTS THE        *
*        NEEDED INFORMATION AND CREATES A SMALLER FILE WHICH IS USED        *
*        AS INPUT FOR STEP5.  SPECIFICALLY THE PROGRAM SELECTS ALL          *
*        ENLISTED MARINES WHO ARE PRESENTLY IN THE 2D MARINE DIVISION       *
*        (MCC 122) OR ELSE ARE EXPECTED TO TRANSFER TO THE DIVISION IN      *
*        THE NEAR FUTURE.  THIS PROGRAM ALSO CREATES A PSEUDO NAME, SINCE   *
*        THE TEST FILE DOES NOT INCLUDE THE NAME FIELD.                     *
*                                                                           *
*****************************************************************************

       IDENTIFICATION DIVISION.
       PROGRAM-ID.  CREATE-TEST-FILE.
       ENVIRCNMENT DIVISION.
       CONFIGURATION SECTION.
       SOURCE-COMPUTER.  IBM-360-67.
       OBJECT-COMPUTER.  IBM-360-67.
       INPUT-OUTPUT SECTION.
       FILE-CONTROL.
           SELECT MMS-IN ASSIGN TO UT-2400-S-MMSIN.
           SELECT MMS-OUT ASSIGN TO UT-S-MMSOUT.
       DATA DIVISION.
       FILE SECTION.
       FD  MMS-IN
           RECORD CONTAINS 1200 CHARACTERS
           BLOCK CONTAINS  6 RECORDS
           LABEL RECORDS ARE STANDARD
           DATA RECORD IS MMS-FILE.
       01  MMS-FILE.
           02  FILLER            PIC       X(10).
           02  SERV-NO           PIC       X(10).
           02  INIT-3            PIC       X(3).
           02  FILLER            PIC       X(2).
           02  L-NAME            PIC       X(20).
           02  FILLER            PIC       X(10).
           02  INITS             PIC       XX.
           02  FILLER            PIC       X(30).
           02  RACE              PIC       X.
           02  FILLER            PIC       X(2).
           02  PRES-MCC          PIC       X(3).
           02  PRES-RUC          PIC       9(5).
           02  FILLER            PIC       X(7).
           02  FORM-MCC          PIC       XXX.
```

```
           02   FILLER            PIC         X(12).
           02   FUTR-MCC          PIC         X(3).
           02   FILLER            PIC         X(48).
           02   EDD               PIC         S9(7)      COMP-3.
           02   FILLER            PIC         X(33).
           02   EAS-ACTU          PIC         X(6).
           02   FILLER            PIC         X(48).
           02   RANK-LTR          PIC         X.
           02   RANK              PIC         X.
           02   FILLER            PIC         X(40).
           02   REC-STAT          PIC         X.
           02   FILLER            PIC         X(31).
           02   CIV-ED-L          PIC         X.
           02   FST-MAJ           PIC         XX.
           02   FILLER            PIC         X(3).
           02   BMOS              PIC         9(4).
           02   PMOS              PIC         9(4).
           02   FST-AMOS          PIC         9(4).
           02   SEC-AMOS          PIC         9(4).
           02   FILLER            PIC         X(130).
           02   GT-GCT-S          PIC         S9(3)      COMP-3.
           02   FILLER            PIC         X(20).
           02   SCH-CD1           PIC         X(3).
           02   FILLER            PIC         XX.
           02   SCH-CD2           PIC         X(3).
           02   FILLER            PIC         XX.
           02   SCH-CD3           PIC         X(3).
           02   FILLER            PIC         XX.
           02   SCH-CD4           PIC         X(3).
           02   FILLER            PIC         XX.
           02   SCH-CD5           PIC         X(3).
           02   FILLER            PIC         XX.
           02   SCH-CD6           PIC         X(3).
           02   FILLER            PIC         XX.
           02   SCH-CD7           PIC         X(3).
           02  FILLER             PIC         XX.
           02   SCH-CD8           PIC         X(3).
           02  FILLER             PIC         XX.
           02   RELAT-1           PIC         XX.
           02   FILLER            PIC         X(648).
       FD  MMS-OUT
           RECORD CONTAINS 105 CHARACTERS
           BLOCK CONTAINS 19 RECORDS
           LABEL RECORDS ARE STANDARD
           DATA RECORD IS MMS-TEST.
       01  MMS-TEST               PIC         X(105).
       WORKING-STORAGE SECTION.
       77  COUNTER                PIC         9(9)       VALUE     ZEROES.
```

```
77  SETSSN              PIC       9(9)      VALUE     ZEROES.
77  DIV                 PIC       XXX       VALUE     '122'.
77  ENLISTED            PIC       X         VALUE     'E'.
77  UAD                 PIC       X(6)      VALUE     'UAD   '.
77  COFG                PIC       X(6)      VALUE     'COFG  '.
01  TEMP-RECORD.
    02  SERV-NO         PIC       X(10).
    02  INITS           PIC       X(2).
    02  L-NAME.
        03  INIT-3-X    PIC       X(2)      VALUE     'NM'.
        03  NAME-2      PIC       X(10).
        03  FILLER      PIC       X(8)      VALUE     SPACES.
    02  RACE            PIC       X.
    02  PRES-RUC        PIC       9(5).
    02  EDD             PIC       9(6).
    02  EAS-ACTU        PIC       X(6).
    02  RANK-LTR        PIC       X.
    02  RANK            PIC       X.
    02  BMOS            PIC       9(4).
    02  PMOS            PIC       9(4).
    02  FST-AMOS        PIC       9(4).
    02  SEC-AMOS        PIC       9(4).
    02  REC-STAT        PIC       X.
    02  GT-GCT-S        PIC        9(3).
    02  CIV-ED-L        PIC       X.
    02  FST-MAJ         PIC       XX.
    02  FORM-MCC        PIC       XXX.
    02  RELAT-1         PIC       XX.
    02  SCH-CD1         PIC       X(3).
    02  SCH-CD2         PIC       X(3).
    02  SCH-CD3         PIC       X(3).
    02  SCH-CD4         PIC       X(3).
    02  SCH-CD5         PIC       X(3).
    02  SCH-CD6         PIC       X(3).
    02  SCH-CD7         PIC       X(3).
    02  SCH-CD8         PIC       X(3).
    02  FILLER          PIC       X         VALUE     SPACES.
PROCEDURE DIVISION.
INITIALIZATION SECTION.
    OPEN OUTPUT MMS-OUT.
    OPEN INPUT MMS-IN.
MAINLINE SECTION.
READ-MMS.
    READ MMS-IN, AT END GO TO EOJ.
    IF PRES-MCC OF MMS-FILE IS EQUAL TO DIV GO TO SELECT-REC.
    IF FUTR-MCC OF MMS-FILE IS EQUAL TO DIV GO TO SELECT-REC.
    GO TO READ-MMS.
SELECT-REC.
```

```
           MOVE CORRESPONDING MMS-FILE TO TEMP-RECORD.
           IF RANK-LTR OF TEMP-RECORD NOT EQUAL
               TO ENLISTED GO TO READ-MMS.
           IF EAS-ACTU OF TEMP-RECORD IS EQUAL TO COFG GO TO READ-MMS.
           IF EAS-ACTU OF TEMP-RECORD IS EQUAL TO UAD  GO TO READ-MMS.
           MOVE SERV-NO OF TEMP-RECORD TO NAME-2.
           WRITE MMS-TEST FROM TEMP-RECORD.
           GO TO READ-MMS.
       EOJ.
           CLOSE MMS-IN WITH DISP.
           CLOSE MMS-OUT.
           STOP RUN.
//GO.MMSIN  DD  UNIT=2400,DISP=(OLD,KEEP),LABEL=(2,BLP),
//     DCB=(RECFM=FB,LRECL=1200,BLKSIZE=7200,EROPT=SKP),
//      VOL=SER=XXXXXX
//GO.MMSOUT  DD  UNIT=2321,SPACE=(TRK,(150,10),RLSE),
//   DCB=(RECFM=FB,LRECL=105,BLKSIZE=1995),VOL=SER=CEL002,
//     DISP=(NEW,KEEP),LABEL=EXPDT=75200,
//      DSN=S2204.YYYYYY
*/
```

```
//SIMS5     JOB  (2204,0770,CS42),'SIMS',TIME=9
//STEP5  EXEC  FORTHCLG,REGION=300K
//FORT.SYSIN  DD  *
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                      C
C        STEP5 IS A FAIRLY COMPLICATED STEP WHICH CREATES 'MANLEV',    C
C        'MINOR' AND 'DUEIN'.  IT USES THE OUTPUTS OF STEP3 AND STEP4  C
C        AS WELL AS VARIOUS CARD INPUTS.  THIS PROGRAM WAS DESIGNED IN C
C        TOP-DOWN FASHION AND THIS SECTION IS THE MAIN PROGRAM WHICH   C
C        IS ESSENTIALLY A CONTROL PROGRAM.  IT FIRST READS THE CURRENT C
C        DATE FROM THE CARD READER, THEN READS THE T/O'S WHICH WERE    C
C        OUTPUT FROM STEP3.  THE PROGRAM THEN ENCODES THESE T/O'S TO   C
C        CONSERVE SPACE.  THE LETTERS AND DIGITS ARE READ INTO         C
C        CORRESPONDING ARRAYS TO ENABLE COMPARISONS THROUGHOUT THE     C
C        PROGRAM.  THE NEXT STEP IS TO READ THE MMS FILE AND DETERMINE C
C        WHICH BILLETS ARE CURRENTLY BEING FILLED.  THE FINAL STEP OF  C
C        THE MAIN PROGRAM IS TO WRITE 'MANLEV' AND 'MINOR'.            C
C                                                                      C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
      IMPLICIT INTEGER*2 (A-Z)
      INTEGER*4 SSN,IDATE,IEAS,IEDD,RUC
      INTEGER*4 MAJSUB,FMCC,SCHOOL,NAME,INIT
      COMMON SSN,IDATE,RUC,MAJSUB,FMCC,SCHOOL(8),NAME(5),INIT
      COMMON TMOS(2000),TRUC(2000),E9(2000),E8(2000),E7(2000),E6(2000)
      COMMON E5(2000),E4(2000),E3(2000),E2E1(2000),TOTAL(2000)
      COMMON NMAX,MONTH,DAY,YEAR,LETTER(27),MOS,RANK,DIGIT(10)
      COMMON CIVED,IRUC(120),MINOR(120),DEPEND(2)
      COMMON PMOS,SMOS,RMOS,BMOS,RECSTA,GCT,RACE
      COMMON  EASYR,EASMO,EASDAY
      COMMON ICADRE(10)
      TOSUM=0
      OHSUM=0
      CALL RDATE
      IDATE=365*YEAR+30*MONTH+DAY
      CALL READTO
      CALL ENCODE
      CALL RLETER
      CALL RDMMS
      DO 70 I=1,NMAX
      WRITE(11,100) TMOS(I),TRUC(I),E9(I),E8(I),E7(I),E6(I),E5(I),
     XE4(I),E3(I),E2E1(I),TOTAL(I)
  100 FORMAT (1X,I4,1X,I5,9(1X,I6))
      IF (TRUC(I).EQ.0)  GO TO 69
   70 CONTINUE
   69 DO 77 I=1,120
      IF (IRUC(I).EQ.0)  GO TO 75
```

```
      WRITE(12,777) IRUC(I),MINOR(I)
  777 FORMAT(1X,2I7)
   77 CONTINUE
   75 DO 71 I=1,NMAX
      TOSUM=TOSUM+TOTAL(I)/200
      OHSUM=OHSUM+(TOTAL(I)-TOTAL(I)/200*200)
   71 CONTINUE
      WRITE (6,101) TOSUM,OHSUM
  101 FORMAT (1X,2I8)
      STOP
      END
```

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                      C
C        RDMMS IS A SUBROUTINE WHICH READS THE MMS FILE AND REJECTS    C
C        THE RECORD IF IT IS NOT ENLISTED, THEN COMBINES SUB-UNITS     C
C        WITH THE SUPERIOR UNIT.  AT THIS POINT THE PROGRAM CHECKS THE C
C        RECORD STATUS CODE AND IF IT CONTAINS A 4 THEN THE MARINE IS  C
C        EXPECTED TO REPORT IN TO THE DIVISION AND HENCE HIS RECORD IS C
C        PLACED IN THE 'DUEIN' FILE.  THE PROGRAM THEN DETERMINES IF THE C
C        MARINE IS EXPECTED TO LEAVE WITHIN THE NEXT 30 DAYS.  IF NOT  C
C        THEN THE BILLET HE IS FILLING IS DETERMINED BY SETMOS AN THEN C
C        'MANLEV' IS UPDATED TO RELLECT THIS.                          C
C                                                                      C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
      SUBROUTINE RDMMS
      IMPLICIT INTEGER*2 (A-Z)
      INTEGER*4 SSN,IDATE,IEAS,IEDD,RUC
      INTEGER*4 MAJSUB,FMCC,SCHOOL,NAME,INIT
      COMMON SSN,IDATE,RUC,MAJSUB,FMCC,SCHOOL(8),NAME(5),INIT
      COMMON TMOS(2000),TRUC(2000),E9(2000),E8(2000),E7(2000),E6(2000)
      COMMON E5(2000),E4(2000),E3(2000),E2E1(2000),TOTAL(2000)
      COMMON NMAX,MONTH,DAY,YEAR,LETTER(27),MOS,RANK,DIGIT(10)
      COMMON CIVED,IRUC(120),MINOR(120),DEPEND(2)
      COMMON PMOS,SMOS,RMOS,BMOS,RECSTA,GCT,RACE
      COMMON  EASYR,EASMO,EASDAY
      COMMON ICADRE(10)
    1 READ(3,100,END=7) SSN,INIT,NAME,RACE,RUC,EDDYR,EDDMO,EDDDAY,
     XEASYR,EASMO,EASDAY,RNKLTR,RANK,BMOS,PMOS,SMOS,RMOS,RECSTA,GCT,
     XCIVED,MAJSUB,FMCC,DEPEND,SCHOOL
  100 FORMAT(I10,A2,5A4,A1,I5,3I2,3I2,A1,I1,4I4,A1,I3,A1,A2,A3,2A1,8A3)
      MOS=0
      IF (RNKLTR.NE. LETTER(5))  GO TO 1
      IF (RUC.GT.42000.AND.RUC.LT.42673) RUC=RUC-30000
      IF (RECSTA.EQ.DIGIT(4))  CALL SAVREC
      IEAS=EASYR*365+EASMO*30+EASDAY
      IF  (IEAS-30.LT.IDATE) GO TO 1
      IEDD=EDDYR*365+EDDMO*30+EDDDAY
      IF (EDDYR.EQ.0) GO TO 90
      IF  (IEDD-30.LT.IDATE)  GO TO 1
   90 IF (RECSTA.EQ.DIGIT(10))  CALL SETMOS
      IF (RECSTA.EQ.DIGIT(1))  CALL SETMOS
      IF (MOS.GT.0)  GO TO 20
      GO TO 1
   20 CALL ASSIGN
      GO TO 1
    7 CONTINUE
      RETURN
      END
```

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                       C
C         READTO IS A SIMPLE SUBROUTINE WHICH READS THE OUTPUT OF STEP3.  C
C         READTO ESSENTIALLY PUTS THE T/O INTO 'MANLEV'.  AS IT READS     C
C         EACH T/O IT DETERMINES WHETHER THAT PARTICULAR UNIT IS CADRED.  C
C         IF THE T/O IS FOR A CADRED UNIT IT IS NOT CONSIDERED.           C
C                                                                       C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
      SUBROUTINE READTO
      IMPLICIT INTEGER*2 (A-Z)
      INTEGER*4 SSN,IDATE,IEAS,IEDD,RUC
      INTEGER*4 MAJSUB,FMCC,SCHOOL,NAME,INIT
      COMMON SSN,IDATE,RUC,MAJSUB,FMCC,SCHOOL(8),NAME(5),INIT
      COMMON TMOS(2000),TRUC(2000),E9(2000),E8(2000),E7(2000),E6(2000)
      COMMON E5(2000),E4(2000),E3(2000),E2E1(2000),TOTAL(2000)
      COMMON NMAX,MONTH,DAY,YEAR,LETTER(27),MOS,RANK,DIGIT(10)
      COMMON CIVED,IRUC(120),MINOR(120),DEPEND(2)
      COMMON PMOS,SMOS,RMOS,BMOS,RECSTA,GCT,RACE
      CCMMON  EASYR,EASMO,EASDAY
      COMMON ICADRE(10)
      READ(9,101) NMAX
  101 FORMAT (1X,I5)
      WRITE (6,200) NMAX
  200 FORMAT (1X,'NMAX IS',I5)
      READ(5,300) ICADRE
  300 FORMAT(I5)
      I=1
   30 READ(9,100,END=7) TMOS(I),TRUC(I),E9(I),E8(I),E7(I),E6(I),E5(I),
     XE4(I),E3(I),E2E1(I),TOTAL(I)
  100 FORMAT (1X,I4,1X,I5,9(2X,I3))
      DO 41 J=1,10
      IF (TRUC(I).EQ.ICADRE(J))  GO TO 40
   41 CONTINUE
      I=I+1
   40 GO TO 30
    7 NMAX=I-1
      WRITE (6,200) NMAX
      DO 91 J=NMAX,2000
      TMOS(J)=0
      TRUC(J)=0
      E9(J)=0
      E8(J)=0
      E7(J)=0
      E6(J)=0
      E5(J)=0
      E4(J)=0
      E3(J)=0
```

```
   E2E1(J)=0
91 TOTAL(J)=0
   RETURN
   END
```

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                       C
C        ENCODE IS A SIMPLE SUBROUTINE WHICH TAKES 'MANLEV' AND ENCODES C
C        THE T/O NUMBER BY MULTIPLYING BY 200.  THE PURPOSE OF THIS     C
C        ENCODING IS TO CONSERVE SPACE IN MEMORY.  THE T/O AND O/H WILL C
C        BOTH BE STORED IN THE SAME WORD WHICH REDUCES STORAGE BY 50%.  C
C        THEY ARE STORED USING THE POLYNOMIAL EXPRESSION:               C
C                                                                       C
C                  T/O * (200**1) + O/H * (200**0)                      C
C                                                                       C
C        OR MORE SIMPLY                                                 C
C                                                                       C
C                  200 * T/O + O/H.                                     C
C                                                                       C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
      SUBROUTINE ENCODE
      IMPLICIT INTEGER*2 (A-Z)
      INTEGER*4 SSN,IDATE,IEAS,IEDD,RUC
      INTEGER*4 MAJSUB,FMCC,SCHOOL,NAME,INIT
      COMMON SSN,IDATE,RUC,MAJSUB,FMCC,SCHOOL(8),NAME(5),INIT
      COMMON TMOS(2000),TRUC(2000),E9(2000),E8(2000),E7(2000),E6(2000)
      COMMON E5(2000),E4(2000),E3(2000),E2E1(2000),TOTAL(2000)
      COMMON NMAX,MONTH,DAY,YEAR,LETTER(27),MOS,RANK,DIGIT(10)
      COMMON CIVED,IRUC(120),MINOR(120),DEPEND(2)
      COMMON PMOS,SMOS,RMOS,BMOS,RECSTA,GCT,RACE
      COMMON  EASYR,EASMO,EASDAY
      COMMON ICADRE(10)
      DO 93 I=1,NMAX
      E9(I)=E9(I)*200
      E8(I)=E8(I)*200
      E7(I)=E7(I)*200
      E6(I)=E6(I)*200
      E5(I)=E5(I)*200
      E4(I)=E4(I)*200
      E3(I)=E3(I)*200
      E2E1(I)=E2E1(I)*200
      TOTAL(I)=TOTAL(I)*200
   93 CONTINUE
      RETURN
      END
```

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                      C
C         SETMOS IS A SIMPLE SUBROUTINE WHICH DETERMINES WHICH BILLET  C
C         A MARINE IS PRESENTLY FILLING.  NORMALLY THE BILLET MOS IS   C
C         CORRECT, HOWEVER TO INSURE THE PROPER DETERMINATION OF BILLETS
C         THE FOLLOWING METHOD WAS USED.                               C
C                                                                      C
C         1)  IF A MARINE'S BILLET MOS MATCHES ANY OF HIS THREE MOSES, C
C         IT IS ASSUMED THAT HE CURRENTLY FILLS THE MOS DESIGNATED BY  C
C         HIS BILLET MOS.                                              C
C                                                                      C
C         2)  IF STEP1 DOES NOT DETERMINE A MARINES BILLET THEN THE    C
C         MARINE'S PRIMARY MOS IS CHECKED FOR A BASIC MOS (XX00).  IF  C
C         A BASIC MOS IT IS ASSUMED THAT HE FILLS THE BILLET DESIGNATED
C         BY HIS BILLET MOS.                                           C
C                                                                      C
C         3)  IF STEP1 AND STEP2 DO NOT DETERMINE A MARINES BILLET THEN
C         IT IS ASSUMED THAT HE IS ASSIGNED A BILLET COMMENSURATE WITH C
C         HIS PRIMARY MOS.                                             C
C                                                                      C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
      SUBROUTINE SETMOS
      IMPLICIT INTEGER*2 (A-Z)
      INTEGER*4 SSN,IDATE,IEAS,IEDD,RUC
      INTEGER*4 MAJSUB,FMCC,SCHOOL,NAME,INIT
      COMMON SSN,IDATE,RUC,MAJSUB,FMCC,SCHOOL(8),NAME(5),INIT
      COMMON TMOS(2000),TRUC(2000),E9(2000),E8(2000),E7(2000),E6(2000)
      COMMON E5(2000),E4(2000),E3(2000),E2E1(2000),TOTAL(2000)
      COMMON NMAX,MONTH,DAY,YEAR,LETTER(27),MOS,RANK,DIGIT(10)
      COMMON CIVED,IRUC(120),MINOR(120),DEPEND(2)
      COMMON PMOS,SMOS,RMOS,BMOS,RECSTA,GCT,RACE
      COMMON  EASYR,EASMO,EASDAY
      COMMON ICADRE(10)
      IF (RUC.LT.12000.OR.RUC.GT.12672) GO TO 10
      IF (PMOS.EQ.BMOS)  GO TO 70
      IF (PMOS.EQ.(PMOS/100)*100)  GO TO 70
      IF (SMOS.EQ.BMOS)  GO TO 70
      IF (RMOS.EQ.BMOS)  GO TO 70
      MOS=PMOS
      GO TO 10
   70 MOS=BMOS
   10 RETURN
      END
```

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                          C
C        SAVREC IS A SUBROUTINE WHICH FIRST DETERMINES WHETHER A MARINE    C
C        HAS DEPENDENTS.  IF HE HAS DEPENDENTS THE MARRIED FLAG IS SET     C
C        TO Y OTHERWISE IT IS SET TO N.  THE RECORD IS THEN PLACED INTO    C
C        THE FILE 'DUEIN'.                                                 C
C                                                                          C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
      SUBROUTINE SAVREC
      IMPLICIT INTEGER*2 (A-Z)
      INTEGER*4 SSN,IDATE,IEAS,IEDD,RUC
      INTEGER*4 MAJSUB,FMCC,SCHOOL,NAME,INIT
      COMMON SSN,IDATE,RUC,MAJSUB,FMCC,SCHOOL(8),NAME(5),INIT
      COMMON TMOS(2000),TRUC(2000),E9(2000),E8(2000),E7(2000),E6(2000)
      COMMON E5(2000),E4(2000),E3(2000),E2E1(2000),TOTAL(2000)
      COMMON NMAX,MONTH,DAY,YEAR,LETTER(27),MOS,RANK,DIGIT(10)
      COMMON CIVED,IRUC(120),MINOR(120),DEPEND(2)
      COMMON PMOS,SMOS,RMOS,BMOS,RECSTA,GCT,RACE
      COMMON  EASYR,EASMO,EASDAY
      COMMON ICADRE(10)
      IF(DEPEND(1).EQ.LETTER(27)) GO TO 27
      IF(DEPEND(1).EQ.DIGIT(10))  GO TO 27
      IF(DEPEND(2).EQ.DIGIT(10))  GO TO 27
      IF(DEPEND(2).EQ.LETTER(27))  GO TO 27
      MARRID=LETTER(25)
      GO TO 28
   27 MARRID=LETTER(14)
   28 CONTINUE
      WRITE (6,101) SSN,PMOS,SMOS,RMOS,RANK,NAME(1),NAME(2),NAME(3),
     XINIT,GCT,CIVED,MAJSUB,EASYR,EASMO,EASDAY,FMCC,MARRID,SCHOOL,RACE
      WRITE(10,101) SSN,PMOS,SMOS,RMOS,RANK,NAME(1),NAME(2),NAME(3),
     XINIT,GCT,CIVED,MAJSUB,EASYR,EASMO,EASDAY,FMCC,MARRID,SCHOOL,RACE
  101 FORMAT(1X,I10,3I5,1X,I2,1X,4A4,I4,1X,A1,1X,A2,3I3,1X,A4,1X,
     XA1,8(1X,A3)1X,A1)
      RETURN
      END
```

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                          C
C        RLETER IS A SUBROUTINE WHICH READS ALL THE ALPHABETIC LETTERS     C
C        INTO AN ARRAY WHICH IS USED FOR CHARACTER COMPARISON.  IT THEN    C
C        READS IN THE TEN DIGITS ALSO FOR CHARACTER COMPARISON.  THE       C
C        SUBROUTINE THEN READS FROM CARDS ALL RUCS IN THE 2D DIVISION.     C
C                                                                          C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
      SUBROUTINE RLETER
      IMPLICIT INTEGER*2 (A-Z)
      INTEGER*4 SSN,IDATE,IEAS,IEDD,RUC
      INTEGER*4 MAJSUB,FMCC,SCHOOL,NAME,INIT
      COMMON SSN,IDATE,RUC,MAJSUB,FMCC,SCHOOL(8),NAME(5),INIT
      COMMON TMOS(2000),TRUC(2000),E9(2000),E8(2000),E7(2000),E6(2000)
      COMMON E5(2000),E4(2000),E3(2000),E2E1(2000),TOTAL(2000)
      COMMON NMAX,MONTH,DAY,YEAR,LETTER(27),MOS,RANK,DIGIT(10)
      COMMON CIVED,IRUC(120),MINOR(120),DEPEND(2)
      COMMON PMOS,SMOS,RMOS,BMOS,RECSTA,CCT,RACE
      COMMON  EASYR,EASMO,EASDAY
      COMMON ICADRE(10)
      READ(5,100) LETTER
  100 FORMAT (27A1)
      READ (5,300) DIGIT
  300 FORMAT (10A1)
      DO 77 I=1,120
      MINOR(I)=0
   77 IRUC(I)=0
      DO 88 J=1,120
      READ (5,200,END=7) IRUC(J)
  200 FORMAT (I7)
   88 CONTINUE
    7 RETURN
      END
```

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                      C
C        RDATE IS A SUBROUITNE WHICH READS THE CURRENT DATE FROM CARD  C
C        INPUT.                                                        C
C                                                                      C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
      SUBROUTINE RDATE
      IMPLICIT INTEGER*2 (A-Z)
      INTEGER*4 SSN,IDATE,IEAS,IEDD,RUC
      INTEGER*4 MAJSUB,FMCC,SCHOOL,NAME,INIT
      COMMON SSN,IDATE,RUC,MAJSUB,FMCC,SCHOOL(8),NAME(5),INIT
      COMMON TMOS(2000),TRUC(2000),E9(2000),E8(2000),E7(2000),E6(2000)
      COMMON E5(2000),E4(2000),E3(2000),E2E1(2000),TOTAL(2000)
      COMMON NMAX,MONTH,DAY,YEAR,LETTER(27),MOS,RANK,DIGIT(10)
      COMMON CIVED,IRUC(120),MINOR(120),DEPEND(2)
      COMMON PMOS,SMOS,RMOS,BMOS,RECSTA,GCT,RACE
      COMMON  EASYR,EASMO,EASDAY
      COMMON ICADRE(10)
      READ(5,200) MONTH,DAY,YEAR
  200 FORMAT (I2,2(1X,I2))
      WRITE (6,201) MONTH,DAY,YEAR
  201 FORMAT (1X,'DATE IS ',3(2X,I2))
      RETURN
      END
```

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                      C
C        ASSIGN IS A SUBROUTINE WHICH ACTUALLY ACCOUNTS FOR EACH MARINE C
C        PRESENTLY IN THE DIVISION.  FOR EACH MARINE IT FINDS THE BILLET C
C        THAT HE FILLS AND ADDS ONE TO THE O/H IN 'MANLEV' FOR THAT    C
C        MOS, RUC AND RANK.  IF THE MARINE IS OF A MINORITY RACIAL GROUP C
C        THEN ONE IS ADDED TO THE APPROPRIATE RUC IN 'MINOR'.  IF THE  C
C        MARINE HAS A GCT BELOW 90 THEN ONE IS ADDED TO THE APPROPRIATE C
C        RUC IN MINOR.  THE NUMBERS OF EACH CATEGORY ARE ENCODED TO    C
C        SAVE SPACE BY MULTIPLYING NUMBER OF MINORITY RACE BY 200.  HENCE C
C        BOTH NUMBERS ARE STORED IN A SINGLE WORD BY THE FORMULA;      C
C                                                                      C
C             200*(NUMBER OF MINORITIES)+NUMBER OF LOW GCT'S           C
C                                                                      C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
      SUBROUTINE ASSIGN
      IMPLICIT INTEGER*2 (A-Z)
      INTEGER*4 SSN,IDATE,IEAS,IEDD,RUC,RANK4
      INTEGER*4 MAJSUB,FMCC,SCHOOL,NAME,INIT
      COMMON SSN,IDATE,RUC,MAJSUB,FMCC,SCHOOL(8),NAME(5),INIT
      COMMON TMOS(2000),TRUC(2000),E9(2000),E8(2000),E7(2000),E6(2000)
      COMMON E5(2000),E4(2000),E3(2000),E2E1(2000),TOTAL(2000)
      COMMON NMAX,MONTH,DAY,YEAR,LETTER(27),MOS,RANK,DIGIT(10)
      COMMON CIVED,IRUC(120),MINOR(120),DEPEND(2)
      COMMON PMOS,SMOS,RMOS,BMOS,RECSTA,GCT,RACE
      COMMON  EASYR,EASMO,EASDAY
      COMMON ICADRE(10)
      DO 70 I=1,NMAX
      IF (MOS.GT.TMOS(I))  GO TO 70
      IF (MOS.LT. TMOS(I))  GO TO 80
      IF (RUC.NE.TRUC(I))  GO TO 70
      RANK4=RANK
      GO TO (1,1,3,4,5,6,7,8,9), RANK4
      GO TO 60
    1 E2E1(I)=E2E1(I)+1
      GO TO 60
    3 E3(I)=E3(I)+1
      GO TO 60
    4 E4(I)=E4(I)+1
      GO TO 60
    5 E5(I)=E5(I)+1
      GO TO 60
    6 E6(I)=E6(I)+1
      GO TO 60
    7 E7(I)=E7(I)+1
      GO TO 60
    8 E8(I)=E8(I)+1
```

```
      GO TO 60
    9 E9(I)=E9(I)+1
   60 TOTAL(I)=TOTAL(I)+1
      GO TO 11
   70 CONTINUE
      GO TO 80
   11 DO 77 K=1,120
      IF (IRUC(K).NE.RUC) GO TO 77
      IF (RACE.EQ.LETTER(3)) GO TO 66
      MINOR(K)=MINOR(K)+200
   66 IF (GCT.GE.90) GO TO 80
      IF (GCT.EQ.0)  GO TO 80
      MINOR(K)=MINOR(K)+1
      GO TO 80
   77 CONTINUE
   80 RETURN
      END
//GO.FT03F001   DD   UNIT=2400,DISP=(OLD,KEEP),
//       VOL=SER=NPS479,DSN=S2204.MMS.LIVE
//GO.FT09F001   DD   DSN=S2204.TMR9,VOL=SER=CEL002,UNIT=2321,
//      LABEL=(,,,IN),DISP=SHR
//GO.FT10F001   DD   UNIT=2400,VOL=SER=NPS478,LABEL=(,SL),
//       DSNAME=S2204.DUEIN,DISP=(NEW,KEEP),DCB=(RECFM=FB,LRECL=106,
//       BLKSIZE=1060)
//GO.FT11F001   DD   SYSOUT=B,DCB=(RECFM=FB,LRECL=80,BLKSIZE=800)
//GO.FT12F001   DD   SYSOUT=B,DCB=(RECFM=FB,LRECL=80,BLKSIZE=800)
//GO.SYSIN  DD  *
03 15 75
12023
12024
12045
12116
12554
00000
00000
00000
00000
00000
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890
  12003
  12008
  12010
  12012
  12021
  12022
  12023
  12024
```

12025
12101
12111
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12114
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12136
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12138
12151
12161
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12181
12185
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12187
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12201
12211
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12215
12216
12221
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12225
12226
12227

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 12231
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 12301
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 12334
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 12341
 12343
 12344
 12345
 12401
 12403
 12404
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 12407
 12551
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 12651
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 12654
 12661
 12670
 12671
 12672
*/
```

```
//SIM2204  JOB  (2204,0770,CS42),'SIMS',TIME=4
//  EXEC  FORTHCLG,REGION=300K
//FORT.SYSIN  DD  DSN=SSP3(HIST),DISP=SHR
//  DD  *
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                                C
C        THIS PROGRAM IS DESIGNED TO FIND THE DISTRIBUTION OF POINTS              C
C        WHICH ARE GENERATED BY THE THREE ASSIGNMENT FUNCTIONS BASED              C
C        UPON OVERAGE/SHORTAGE, RACE, AND GCT.  THE PROGRAM TAKES A               C
C        RANDOM SET OF INPUTS AND MAKES ASSIGNMENTS UNTIL 2000 SAMPLE             C
C        POINTS ARE CREATED FOR EACH FUNCTION.  THESE POINTS ARE THEN             C
C        USED TO GENERATE A HISTOGRAM FOR EACH. TO DETERMINE THEIR                C
C        DISTRIBUTION AS WELL AS FIND THE MEAN AND STANDARD DEVIATION             C
C        OF EACH.  THIS DATA ENABLES THE POINT DISTRIBUTIONS TO BE                C
C        NORMALIZED TO A MEAN OF 0 AND A STANDARD DEVIATION OF 1.                 C
C                                                                                C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
      INTEGER TO,OH,GCT
      DIMENSION LETTER(27)
      DIMENSION PTS(2000),RPTS(2000),DPTS(2000)
      DIMENSION IRUC(95),AMINOR(95),ADUMB(95)
      DIMENSION MANLEV(10,1682),WTS(8,9)
      DIMENSION ICADRE(10)
      DO 85 I=1,10
   85 ICADRE(I)=0
      DMINOR=.313
      DDUMB=.397
      BETA=.98965
      IPTS=0
      READ(5,500) LETTER
  500 FORMAT(27A1)
      DO 20 I=1,1682
      READ(1,100,END=5) MANLEV
  100 FORMAT(I5,I6,8I7)
   20 CONTINUE
    5 CONTINUE
      DO 84 I=1,10
      READ(5,300) ICADRE(I)
  300 FORMAT(I5)
   84 CONTINUE
      WRITE (6,250) ICADRE
  250 FORMAT(1X,I6)
      READ(5,101) WTS
      WRITE(6,101) WTS
  101 FORMAT(8F4.2)
      DO 80 I=1,95
```

```
      READ(5,400,END=1)  IRUC(I),AMINOR(I),ADUMB(I)
      WRITE(6,400)  IRUC(I),AMINOR(I),ADUMB(I)
  400 FORMAT (I8,8X,2F10.3)
   80 CONTINUE
    1 READ(2,102,END=7) IMOS,IRANK,GCT,RACE
  102 FORMAT(12X,I4,12X,I1,18X,I3,54X,A1)
      DO 30 I=1,1682
      IF (IMOS.GT.MANLEV(1,I))  GO TO 30
      IF (IMOS.LT.MANLEV(1,I))  GO TO 40
      IF (IPTS.EQ.2000)  GO TO 7
      DO 81 IC=1,10
      IF (MANLEV(2,I).EQ.ICADRE(IC))  GO TO 30
   81 CONTINUE
      IPTS=IPTS+1
      PTS(IPTS)=0
      DO 31 J=1,8
      TO =MANLEV(J+2,I)/200
      OH=MANLEV(J+2,I)-TO*200
      PTS(IPTS)=PTS(IPTS)+(TO-OH)*BETA**(TO+OH)*WTS(IRANK,J)
   31 CONTINUE
      DO 70 L=1,95
      IF (IRUC(L).EQ.MANLEV(2,I)) GO TO 71
   70 CONTINUE
      GO TO 30
   71 ICONS=1
      IF (RACE.EQ.LETTER(3))  ICONS=-1
      RPTS(IPTS)=AMINOR(L)
      ICONS=1
      IF (GCT.GT.89.OR.GCT.EQ.0)  ICONS=-1
      DPTS(IPTS)=ADUMB(L)
   30 CONTINUE
   40 GO TO 1
    7 CALL HISTG(PTS,IPTS,0)
      CALL HISTG(RPTS,IPTS,0)
      CALL HISTG(DPTS,IPTS,0)
      STOP
      END
//GO.FT01F001   DD   DSN=S2204.MENLEV,DISP=SHR,DCB=(RECFM=FB,LRECL=80,
//       BLKSIZE=800),UNIT=2321,VOL=SER=CEL002,LABEL=(,,,IN)
//GO.FT02F001   DD   DSN=S2204.DDUEIN,
//   VOL=SER=CEL002,UNIT=2321,DISP=SHR,LABEL=(,,,IN)
//GO.SYSIN  DD  *
ABCDEFGHIJKLMNOPQRSTUVWXYZ
12023
12024
12025
12116
12554
```

00000
00000
00000
00000
00000

.00	.00	.00	.00	.00	.05	.10	.85
.00	.0C	.00	.00	.05	.10	.20	.65
.00	.00	.00	.05	.10	.20	.60	.05
.00	.00	.05	.10	.20	.60	.05	.00
.00	.05	.10	.20	.60	.05	.00	.00
.05	.1C	.20	.60	.05	.00	.00	.00
.15	.20	.60	.05	.00	.00	.00	.00
.35	.60	.05	.00	.00	.00	.00	.00
.95	.05	.00	.00	.00	.00	.00	.00

12003	4803	0.002	0.764
12008	8437	0.015	0.108
12010	11438	0.015	0.219
12012	17263	0.123	0.358
12021	5233	0.002	0.002
12022	1004	0.001	0.086
12023	0	-10.594	-3.494
12024	0	-10.594	-3.494
12101	6624	0.008	0.159
12111	14493	0.0	0.0
12113	19689	-0.076	0.0
12114	17491	-0.012	0.0
12115	14514	-0.015	-0.168
12116	0	1.0	1.0
12121	8650	0.001	0.006
12124	13698	-0.023	-0.097
12125	10059	-0.027	-0.009
12126	14491	-0.051	-0.048
12127	20943	-0.057	-0.125
12131	15894	0.0	0.0
12135	8056	0.0	-0.002
12136	8253	0.0	-0.001
12137	10070	-0.001	-0.011
12138	10068	-0.002	-0.009
12151	8836	0.0	0.056
12161	16288	0.0	0.006
12163	15296	-0.003	-0.003
12164	12690	-0.001	-0.012
12165	18121	-0.022	-0.044
12166	17893	-0.129	-0.014
12171	14904	0.005	0.001
12174	11686	-0.003	-0.041
12175	11470	-0.055	-0.038
12176	9671	0.0	-0.014

12176	9671	0.0	-0.0
12177	13898	-0.009	-0.042
12181	11668	0.0	0.001
12185	10277	-0.011	-0.096
12186	11061	-0.379	-0.129
12187	6845	-0.04	-0.063
12188	8064	0.0	-0.033
12191	3414	0.082	0.253
12192	1406	-0.375	-0.004
12193	404	0.243	0.068
12194	609	0.439	0.082
12201	11840	0.0	0.113
12211	15876	-0.003	0.002
12213	10063	-0.001	-0.001
12214	11060	-0.118	-0.022
12215	13291	-0.088	-0.184
12216	12481	-0.028	-0.04
12221	B30731	0.07	0.028
12224	9259	0.0	0.0
12225	10874	-0.009	-0.028
12226	9263	-0.007	-0.024
12227	10469	-0.016	-0.029
12231	18302	0.0	0.002
12235	16550	-0.025	-0.636
12236	11883	-0.01	-0.042
12237	22745	-0.054	-0.061
12238	17107	-0.186	-0.173
12301	5233	0.095	0.095
12311	4030	0.076	0.033
12313	4831	0.002	0.001
12314	5639	0.0	0.0
12315	4634	0.001	0.0
12321	6637	0.025	0.053
12323	6639	-0.001	0.0
12324	5042	0.0	-0.024
12325	3834	0.028	0.0
12331	6835	0.018	0.064
12333	5636	0.0	0.0
12334	3226	0.044	0.005
12335	3826	0.034	0.02
12341	2616	0.116	0.127
12343	4830	-0.022	-0.017
12344	5231	-0.011	-0.003
12345	4238	0.029	0.0
12401	5651	0.088	0.008
12403	5447	0.0	-0.031
12404	5655	0.002	-0.046
12405	7269	0.007	-0.01

```
    12407    8660      0.054      0.032
    12551   10246      0.003      0.058
    12552    3646      0.039     -0.036
    12553    2831      0.037     -0.004
    12554       0    -00.594     -3.494
    12651    3217      0.02       0.059
    12652    2024      0.108      0.0
    12653    3824      0.001      0.001
    12654    5632     -0.054     -0.014
    12661    6636      0.016      0.046
    12670    6449      0.005      0.0
    12671   13282      0.005      0.006
    12672    7248      0.072      0.058
*/
```

```
    ∇ UDDUEIN
[1]  ⍝ MARINE'S RECORD IS NOT FOUND SO ENTER PERTINENT ASSIGNMENT INFORMATION
[2]   DUEINV←9⍴0 ⋄ DUEINV[6]←100 ⋄ DUEINV[1]←SN
[3]   'PRIMARY MOS?' ⋄ DUEINV[2]←⎕
[4]   →(~AYN 'DO YOU HAVE A SECOND MOS?')⍴L1
[5]   '2ND MOS?' ⋄ DUEINV[3]←⎕
[6]   '3RD MOS?' ⋄ DUEINV[4]←⎕
[7]  L1:'RANK, (1-9)?' ⋄ DUEINV[5]←⎕
[8]   'ENTER EAS (MM DD YY)' ⋄ DUEINV[8 9 7]←⎕
[9]   LIT←105⍴' ' ⋄ →(~AYN 'CAUCASIAN?')⍴0 ⋄ LIT[105]←'C'
    ∇
```

```
     ∇ MOS J;V;N;SML;X;TOM;OHM;WTV;PTM;PTV;J;I
[1]    ⍝ MOS IS PASSED A NUMBER 1, 2, OR 3 INDICATING WHICH MOS IS TO BE PROCESSED
[2]     FLAG←0 ⋄ →((⍴MOSV)≥I←MOSV⍳DUEINV[J+1])⍴L1 ⋄ 'NO RUC REQUIRING MOS-';DUEINV[J+1] ⋄
        FLAG←1 ⋄ →0
[3]    ⍝ READ COMPONENT OF MANLEV WHICH CORRESPONDS TO MOS BEING PROCESSED
[4]    L1:N←1↑⍴M←FE 6,2,1+MOSV⍳DUEINV[J+1]
[5]    ⍝ DECODE T/O AND O/H COUNTS FOR EACH RANK OF EVERY RUC
[6]     OHM←X-200×TOM←⌊(X←M[;2+⍳8])÷200
[7]    ⍝ CALCULATE POINTS FOR EACH RANK OF THE GIVEN RUC
[8]     PTM←(E⋆TOM+OHM)×TOM-OHM ⋄ PTS←(N,0)⍴0
[9]    ⍝ COMBINE RANK POINTS USING ASSIGNWT TO OBTAIN A TOTAL AND THEN NORMALIZE
[10]    PTS←TM←⍉(2,N)⍴M[;2],((+/PTM×(N,8)⍴,ASSIGNWT[DUEINV[5];])-MEAN[1])÷SD[1]
     ∇
```

```
    ∇ OUTPUT M
[1]   2ρLF ⍟ 'BEST ASSIGNMENTS FOR MOS-';DUFINV[M+1] ⍟ LF
[2]   '         RUC          OH/TO          RACE          ED-LEVEL          TOTAL       DEPLOYABLE' ⍟ LF
[3]   PTS←PTS[⍒PTS[;5];] ⍟ →(DE=0)ρL1 ⍟ PTS←PTS[⍒PTS[;6];]
[4]  L1:'X6,I5,X5,F6.2,X5,F6.2,X7,F6.2,X6,F6.2,X7,I1' ΔFMT(N,6)↑PTS ⍟ 2ρLF
    ∇


    ∇ RACGCT
[1]   PTS←PTS,MINOR[RUCV←,MINOR[;1]⍳TM[;1]; 2 3]
[2]  ⍝ ALTER RACE POINTS IF MARINE IS CAUCASIAN
[3]   →(LIT[105]≠'C')ρL1 ⍟ PTS[;3]←-PTS[;3]
[4]  ⍝ ALTER MENTAL GROUP POINTS IF MARINE IS NOT A CAT IV OR V
[5]  L1:→(DUEINV[6]<30)ρL2 ⍟ PTS[;4]←-PTS[;4]
[6]  ⍝ OUTPUT SCORES PREVIOUSLY CALCULATED AND A COMBINED TOTAL
[7]  L2:N1←ρRUCV ⍟ PTS←PTS,+/PTS[; 2 3 4]←PTS[; 2 3 4]×(N1,3)ρMANWTS[1]
    ∇
```

```
      ∇ INIT;N;I;V
[1]     FE 3,(FE 18) ⋄ '4191164 MANLEV' FE 4,2 ⋄ '4191164 DUFIN' FE 4,1 ⋄ '4191164 MINOR'
        FE 4,3
[2]    ⍝ CREATE SSNV
[3]     N←-/V←⌽2↑FE 10,1 ⋄ I←V[2] ⋄ SSNV←0⍴0
[4]    L1:SSNV←SSNV,ΔFI(FE 6,1,I)[2+⍳10]
[5]     →(N≥I←I+1)⍴L1 ⋄ R←1+1↑⍴MINOR←(FE 6,3,1),0
[6]    ⍝ CREATE TOTALS AND MOSV
[7]     N←-/V←⌽2↑FE 10,2 ⋄ I←V[2] ⋄ MOSV←0⍴0
[8]    L3:MOSV←MOSV,, 1 1 ↑M←(FE 6,2,I)[; 1 2 11]
[9]     L←⍴M[;3]←,((2⍴200)⊤M[;3])[2;] ⋄ J←1
[10]   L2:MINOR[K;3]←MINOR[K←MINOR[;1]⍳((0 1)↓M)[J;1];3]+M[J;3]
[11]    →(L≥J←J+1)⍴L2 ⋄ →(N≥I←I+1)⍴L3 ⋄ TOTALS←MINOR
[12]   ⍝ UNITS ONLAND TOTALS ARE NOW CONTAINED IN COL. 3 OF MINOR
[13]    M←M,[1]+⌿M←⍉(2⍴200)⊤MINOR[;2]
[14]   ⍝ GENERATE DIV AND UNIT RATIO OF RACIAL MINORITIES AND MENTAL GROUPS
[15]    RATIO←M÷⍉(2,R)⍴TM,+/TM←MINOR[;3] ⋄ I←1
[16]   ⍝ GENERATE POINTS FOR EACH UNIT AND THEN NORMALIZE
[17]   L4:MINOR[;I+1]←(((ALPHA×1-(¯1↓RATIO[;I])÷RATIO[R;I])*3)-MEAN[I+1])÷SD[I+1]
[18]    →(2≥I←I+1)⍴L4
      ∇
```

```
    ∇ DUEINPRT RI;T1;T2;T3;T4
[1]   ⍝ DUEINPRT IS PASSED THE RECORD NUMBER OF THE MARINE'S RECORD IN DUEIN
[2]   ⍝ FIRST READ THE DUEIN RECORD AND CONVERT CERTAIN CHARACTER INFORMATION TO NUMERIC
[3]    2⍴LF ⋄ LIT←FR̲ 6,1,RI
[4]    DUEINV←AFI(LIT[1+⍳29],LIT[46+⍳5],LIT[55+⍳10])
[5]   ⍝ PRINT OUT DATA SHEET
[6]    T1←(5⍴' '),'RANK      RACE'
[7]    '          LAST NAME      INITIALS      SOC-SEC-NO',T1
[8]    T2←'         E-',LIT[29],'          ',LIT[105]
[9]    '       ',LIT[30+⍳12],'          ',LIT[43 44],'          ',LIT[3 4 5],'-',LIT[6 7],'-',LIT
      [8 9 10 11],T2
[10]   T3←5⍴' ' ⋄ LF ⋄ (10⍴T3),'PMOS',T3,'SMOS',T3,'TMOS',T3,'GCT',T3,'ED-LEVEL',T3,'MAJ-S
      UP'
[11]   T3←'     ',LIT[52],'             ',LIT[54 55]
[12]   '             ',(,'ZI4,X5,ZI4,X5,ZI4,X5,BI3' ∆FMT DUEINV[2 3 4 6]),T3
[13]   LF ⋄ '          FORMER-MCC        MARRIED/SINGLE             EAS' ⋄ →(LIT[71]='Y')⍴L1 ⋄ T4←
      ' SINGLE' ⋄ →L2
[14]  L1:T4←'MARRIED'
[15]  L2:(12⍴' '),LIT[65+⍳3],(13⍴' '),T4,(10⍴' '),LIT[60 61],'/',LIT[63 64],'/',LIT[
      57 58]
[16]   LF ⋄ '          SCHOOLS'
[17]   (10⍴' '),LIT[72+⍳3],'    ',LIT[76+⍳3],'    ',LIT[80+⍳3],'    ',LIT[84+⍳3]
[18]   (10⍴' '),LIT[88+⍳3],'    ',LIT[92+⍳3],'    ',LIT[96+⍳3],'    ',LIT[100+⍳3] ⋄
      2⍴LF
    ∇
```

```
    ∇ DPLOY;D;I;MAX;A;EAS;DEPART
[1]   ⍝ CHECK EACH RUC ELIGIBLE FOR ASSIGNMENT AGAINST DEPLOYABILITY TABLE TO DETERMINE ST
       ATUS
[2]   ⍝ IN REGARD TO EAS
[3]    PTS←PTS,1 ⋄ I←1 ⋄ MAX←(⍴PTS)[1]
[4]   L1:→(I>MAX)⍴0
[5]    →((A←DEPLOY[;1]⍳PTS[I;1])≤(⍴DEPLOY)[1])⍴L2
[6]   L3:PTS[I;6]←1 ⋄ I←I+1 ⋄ →L1
[7]   L2:EAS← 365 30 1 ⊥DUEINV[7 8 9] ⋄ DEPART← 365 30 1 ⊥.DEPLOY[A; 2 3 4]
[8]   ⍝ NOT ELIGIBLE IF EAS > (DEPARTURE DATE - 1 MONTH) OR IF EAS < (DEPARTURE DATE + 7 M
       ONTHS)
[9]    →(EAS<DEPART-30)⍴L3 ⋄ →(EAS>DEPART+210)⍴L3 ⋄ PTS[I;6]←0 ⋄ I←I+1 ⋄ →L1
    ∇
```

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      ∇ ASSIGN;RI;M1;SN;DI;J;LIT;SN
[1]    ⍝ TIE DUEIN, MANLEV, AND MINOR TO FILES 1, 2, AND 3.
[2]    FE 3,(FE 18) ⋄ '4191164 DUEIN' FE 4,1 ⋄ '4191164 MANLEV' FE 4,2 ⋄ '4191164 MINOR'
       FE 4,3
[3]    ⍝ INITIALIZE GLOBAL VARIABLES
[4]    LF ⋄ DE←0 ⋄ →(~AYN 'DO YOU WISH DEPLOYABILITY TO BE A CRITICAL FACTOR')⍴J1 ⋄ DE←1
[5]   J1:LF ⋄ 'HOW MANY ASSIGNMENT CHOICES DO YOU DESIRE PER MOS?' ⋄ N←⎕
[6]    ⍝ ASSIGNMENT PROCESS BEGINS
[7]   L6:'SSN?' ⋄ →((DI←⍴SSNV)≥RI←SSNV⍳SN←⎕)⍴L1
[8]    'SSN NOT FOUND' ⋄ UDDUEIN ⋄ →L3
[9]    ⍝ OUTPUT DATA SHEET
[10]  L1:DUEINPRT RI
[11]   ⍝ IS PRIMARY MOS A BASIC MOS (XX00)?
[12]  L3:→(M1≠(⌊(M1←DUEINV[2])÷100)×100)⍴L5
[13]   'PRIMARY MOS';M1 ⋄ 'NEW PRIMARY MOS?' ⋄ DUEINV[2]←⎕
[14]   ⍝ LOOP THRU PMOS, SMOS, AND TMOS GENERATING POINTS.
[15]  L5:J←1
[16]  L2:MOS J ⋄ →(FLAG=1)⍴L7 ⋄ RACGCT ⋄ DPLOY ⋄ OUTPUT J
[17]  L7:→(DUEINV[1+J←J+1]=0)⍴L4 ⋄ →(3≥J)⍴L2
[18]  L4:→(AYN 'CONTINUE?')⍴L6
      ∇
```

FILE FORMAT FOR TMR FILE

1) INPUT TO STEP 1

FIELD LOCATION	FIELD LENGTH	TYPE DATA	FIELD DESCRIPTION
1	5	C	T/MR NUMBER
6	5	C	MOS
11	1	C	BRANCH
12	1	C	TYPE
13	1	C	STATUS
14	1	C	FILLER
15	76	P	T/MR AT 100%
15	40	P	FILLER
55	4	P	E9
59	4	P	E8
63	4	P	E7
67	4	P	E6
71	4	P	E5
75	4	P	E4
79	4	P	E3
83	4	P	E2/E1
87	4	P	TOTAL
91	76	P	T/MR AT 97%
167	76	P	T/MR AT 95%
243	76	P	T/MR AT 93%
319	76	P	T/MR AT 90%
395	76	P	T/MR AT 87%
471	76	P	T/MR AT 85%
547	76	P	T/MR AT 83%
623	76	P	T/MR AT 80%
699	76	P	T/MR AT 77%
775	76	P	T/MR AT 75%
851	76	P	T/MR AT 70%
927	2	C	DES CODE

FILE FORMAT FOR

1) INPUT FOR STEPS 2, 3

2) OUTPUT FROM STEPS 1, 2, 3

FIELD LOCATION	FIELD LENGTH	TYPE DATA	FIELD DESCRIPTION
1	4	C	MOS
5	1	C	FILLER
6	5	C	RUC
11	1	C	FILLER
12	5	C	T/MR NO
17	5	C	FILLER
22	3	C	E9
25	4	C	FILLER
29	3	C	E8
32	4	C	FILLER
36	3	C	E7
39	4	C	FILLER
43	3	C	E6
46	4	C	FILLER
50	3	C	E5
53	4	C	FILLER
57	3	C	E4
60	4	C	FILLER
64	3	C	E3
67	4	C	FILLER
71	3	C	E2/E1
74	4	C	FILLER
78	3	C	TOTAL

FILE FORMAT FOR

1) OUTPUT FROM STEP 4

2) INPUT TO STEP 5

FIELD LOCATION	FIELD LENGTH	TYPE DATA	FIELD DESCRIPTION
1	10	C	SERVICE NO
11	2	C	INITIALS
13	20	C	LAST NAME
33	1	C	RACE
34	5	C	PRESENT RUC
39	6	C	EST DATE DEP
45	6	C	EAS DATE
51	1	C	RANK LETTER
52	1	C	RANK
53	4	C	BILLET MOS
57	4	C	PRIMARY MOS
61	4	C	SECONDARY MOS
65	4	C	TERTIARY MOS
69	1	C	RECORD STATUS
70	3	C	GCT
73	1	C	CIVILIAN EDUC
74	2	C	FIRST MAJOR
76	3	C	FORMER MCC
79	2	C	RELATIVE 1
81	3	C	SERV SCH1
84	3	C	SERV SCH2
87	3	C	SERV SCH3
90	3	C	SERV SCH4
93	3	C	SERV SCH5
96	3	C	SERV SCH6
99	3	C	SERV SCH7
102	3	C	SERV SCH8
105	1	C	FILLER

FILE FORMAT FOR MMS FILE

1) INPUT TO STEP 4

THE MMS MASTER FILE CONTAINS 1200 BYTES OF INFORMATION AND MANY SMALLER VERSIONS ARE AVAILABLE WHICH CONTAIN THE NECESSARY INFORMATION FOR INPUT TO STEP 4. ONLY THE NECESSARY FIELDS ARE LISTED AS FILE FORMATS VARY DEPENDING UPON WHICH VERSION OF THE MMS FILE IS USED.

FIELD NAME	FIELD LENGTH
SERV NO	10
LAST NAME	20
INITIALS	2
RACE	1
PRESENT MCC	3
PRESENT RUC	5
FORMER MCC	3
FUTURE MCC	3
EST DATE DEP	6
EAS DATE	6
RANK LETTER	1
RANK	1
RECORD STATUS	1
CIVILIAN EDUC	1
FIRST MAJOR	2
BILLET MOS	4
PRIMARY MOS	4
SECONDARY MOS	4
TERTIARY MOS	4
GCT	3
SERV SCH1	3
SERV SCH2	3
SERV SCH3	3

SERV SCH4	3
SERV SCH5	3
SERV SCH6	3
SERV SCH7	3
SERV SCH8	3
DEPENDENTS	2

FILE FORMAT FOR MANLEV

1) INPUT TO ASSIGNMENT PROGRAM

2) OUTPUT FROM STEP 5

FIELD LOCATION	FIELD LENGTH	TYPE DATA	FIELD DESCRIPTION
1	1	C	FILLER
2	4	C	MOS
6	1	C	FILLER
7	5	C	RUC
12	1	C	FILLER
13	6	■C	NO E9'S
19	1	C	FILLER
20	6	■C	NO E8'S
26	1	C	FILLER
27	6	■C	NO E7'S
33	1	C	FILLER
24	6	■C	NO E6'S
40	1	C	FILLER
41	6	■C	NO E5'S
47	1	C	FILLER
48	6	■C	NO E4'S
54	1	C	FILLER
55	6	■C	NO E3'S
61	1	C	FILLER
62	6	■C	NO E2/E1'S
68	1	C	FILLER
69	6	■C	TOTAL

EACH ELEMENT DENOTED AS TYPE DATA '■C' IS AN ENCODED VALUE. THESE ELEMENTS CONTAIN TWO VALUES, T/O AND O/H ENCODED IN THE FOLLOWING FASHION:

NO = 200 * T/O + O/H

FILE FORMAT FOR MINOR

1) INPUT TO ASSIGNMENT PROGRAM

2) OUTPUT FROM STEP 5

FIELD LOCATION	FIELD LENGTH	TYPE DATA	FIELD DESCRIPTION
1	3	C	FILLER
4	5	C	RUC
9	1	C	FILLER
10	6	*C	NUMBER

THE VALUE DENOTED AS TYPE DATA '*C' IS AN ENCODED VALUE. THIS ELEMENT CONTAINS TWO VALUES, THE NUMBER OF RACIAL MINORITIES (RM) AND THE NUMBER OF MENTAL GROUP IV & V'S (MG) ENCODED IN THE FOLLOWING FASHION:

NUMBER = 200 * RM + MG

FILE FORMAT FOR DUEIN

1) INPUT TO ASSIGNMENT PROGRAM

2) OUTPUT FROM STEP 5

FIELD LOCATION	FIELD LENGTH	TYPE DATA	FIELD DESCRIPTION
1	2	C	FILLER
3	9	C	SERV NO
12	1	C	FILLER
13	4	C	PRIMARY MOS
17	1	C	FILLER
18	4	C	SECONDARY MOS
22	1	C	FILLER
23	4	C	TERTIARY MOS
27	2	C	FILLER
29	1	C	RANK
30	1	C	FILLER
31	12	C	LAST NAME
43	2	C	INITIALS
45	3	C	FILLER
48	3	C	GCT
51	1	C	FILLER
52	1	C	CIVILIAN EDUC
53	1	C	FILLER
54	2	C	FIRST MAJOR
56	1	C	FILLER
57	2	C	EAS YEAR
59	1	C	FILLER
60	2	C	EAS MONTH
62	1	C	FILLER
63	2	C	EAS DAY
65	1	C	FILLER
66	3	C	FORMER MCC
69	2	C	FILLER

71	1	C	MARRIED
72	1	C	FILLER
73	3	C	SERV SCH1
77	3	C	SERV SCH2
81	3	C	SERV SCH3
85	3	C	SERV SCH4
89	3	C	SERV SCH5
93	3	C	SERV SCH6
97	3	C	SERV SCH7
101	3	C	SERV SCH8
105	1	C	RACE

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